VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the **reissuance** of the VPDES permit listed below. This permit is being processed as a **Minor,** Industrial permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260 et seq. The facility serves as a bulk petroleum product storage and distribution center. In addition, separation of pipeline Transmix using an atmospheric distillation process is conducted onsite. Wastewater discharged from Outfall 002 originates from storm water which collects within the AST containment berm, loading racks, Transmix process pad and is released through an oil/water separator to the James River. This permit action consists of evaluating effluent data, revising permit limitations and monitoring requirements, and revising permit special conditions.

1. **Facility Name and Address**: Kinder Morgan Transmix Co., LLC
3302 Deepwater Terminal Road
Richmond, VA 23234

Facility Contact Name:	Patrick Davis
Title:	Environmental Health and Safety Manager
Mailing Address:	2000 Trenton Avenue Richmond, VA 23234
Telephone:	(804) 743-5778
Email:	JPatrick_Davis@kindermorgan.com

2. Permit Number: VA0086151
Permit Expiration Date: April 8, 2011

3. **Owner Name and Address**: Kinder Morgan Transmix Co., LLC
500 Dallas Street
Houston, TX 77002
Telephone No: (713) 369-9000

4. Application Complete: Date: December 2, 2010
Permit Drafted By: Jeremy Kazio Date: March 22 , 2011

Reviewed By: Janine Howard Date: April 6, 2011
Curt Linderman Date: June 8, 2011, August 21, 2012, September 4, 2012

Public Comment Period Dates: October 3, 2012 to 11:59 p.m. on November 5, 2012
Published Dates: October 3, 2012 and October 10, 2012 in *Style Weekly*

5.

Receiving Stream Name:	James River
Basin:	James River (lower)
Subbasin:	N/A
Section:	1
Class:	II
Special Standards:	bb (a, z, ESW-11)*
River Mile:	2-JMS106.22
7-Day, 10-Year Low Flow (7Q10):	455 MGD **
1-Day, 10-Year Low Flow (1Q10):	400 MGD **
30-Day, 5-Year Low Flow (30Q5):	667 MGD **
30-Day, 10-Year Low Flow (30Q10):	596 MGD **
7Q10 High Flow:	1218 MGD **
1Q10 High Flow:	1023 MGD **
Harmonic Mean Flow (HM):	2062 MGD **

Tidal? YES ** On 303(d) list? YES

* - Special standards "a", "z", and "ESW-11" do not apply to the segment of the river basin to which this facility discharges. See Item 25 of this fact sheet for further information regarding special standard "bb".

** - The permittee's discharge point is located 3.72 miles downstream of the James River fall line. Tidal influence, although present, is very minimal and does not represent typical design flow scenarios at this location. Consequently, flow frequencies derived for the James River fall line have been utilized. Flow frequencies have also been adjusted for the significant river water withdrawal from the Henrico County Water Treatment Plant (WTP), which is located upstream of the discharge and downstream of the Cartersville USGS stream flow gage used to determine freshwater inflows at the fall line. The Henrico County WTP is limited to withdrawing a monthly average of 45 MGD from the James River, and therefore this value has been subtracted from the flow frequencies derived for the James River fall line (see **Attachment C** for Flow Frequency Memorandum by Jennifer V. Palmore, P.G. dated February 4, 2011 for flow frequencies provided at the James River fall line).

6. **Operator License Requirements**: A licensed operator is not required because, in accordance with GM96-006 (Pgs 1-2), the retention basin and oil/water separator that serve as treatment for this facility's wastewater are not considered to be forms of biological, chemical, or physical treatment as intended by the requirements contained in 9 VAC 25-31-200.C of the *VPDES Permit Regulation*.

7. **Reliability Class**: Not Applicable

8. **Permit Characterization**:

( ) Issuance
(X) Reissuance
( ) Revoke & Reissue
( ) Owner Modification
( ) Board Modification
( ) Change of Ownership/Name
Effective Date:
( ) Municipal
SIC Code(s):
(X) Industrial
SIC Code(s): 5171
( ) POTW
( ) PVOTW
(X) Private
( ) Federal
( ) State

(X) Existing Discharge
( ) Proposed Discharge
(X) Effluent Limited
(X) Water Quality Limited
( ) WET Limit
( ) Interim Limits in Permit
( ) Interim Limits in Other Document (attached)
( ) Compliance Schedule Required
( ) Site Specific WQ Criteria
( ) Variance to WQ Standards
( ) Water Effects Ratio
( ) Discharge to 303(d) Listed Segment
(X) Toxics Management Program Required
( ) Toxics Reduction Evaluation
( ) Possible Interstate Effect
( ) Storm Water Management Plan

9. **Discharge Description**

Table 1: Discharge Description

OUTFALL NUMBER	DISCHARGE SOURCE	TREATMENT	FLOW
002	Stormwater runoff collected within AST containment berm, loading rack wet wells, and process pads from Transmix distillation process.	Retention basin & Oil/Water Separator	Maximum 30-day average flow reported 11/2006-02/2011 = **0.73 MGD**

See **Attachment A** for facility diagram. Note that the oil/water separator may be intentionally bypassed via activation of a pump during extreme precipitation events in order to prevent floatation of the Aboveground Storage Tanks. This bypass is essential maintenance to assure efficient operation and

does not require notification to DEQ before or after occurrence, provided that the bypass does not cause effluent limitations to be exceeded, in accordance with Part II.U.1.of the permit.

10. **Sewage Sludge Use or Disposal**: Not Applicable

11. **Discharge Location Description*:***
See **Attachment A** for topographic maps and aerial photograph.

Map Name: Drewry's Bluff (099D) Quadrangle

12. **Material Storage**:
The facility receives, stores, and distributes bulk volumes of gasoline and non-gasoline products. In addition, the facility has nominal storage of product dyes and additives. Separation of pipeline Transmix using an atmospheric distillation process is also conducted onsite. Transmix is a mixture of refined gasoline, diesel, and/or jet fuel that combine during pipeline transport. There is no discharge of process wastewater, nor is there exposure of these processes to precipitation during the Transmix distillation process.

The AST's and site are regulated under 9 VAC 25-91-10 et.seq (Facility and Above Ground Storage Tank Regulations). The areas surrounding all above-ground storage tanks are bermed and designed to capture spills/leaks and storm water runoff.

Below are tables listing all AST storage at this site:

Petroleum Product Storage							
Tank No.	Product Stored	AST Year Built	Diameter (ft.)	Height (ft.)	Fill Capacity (gal.)	Safe Fill High Level (gal.)	Allowable Low Level (gal.)
1	Sub-Octane Gasoline	1956	35	48.2	336,000	283,836	34,020
2	RUL Gasoline	1956	50	48	693,000	624,372	70,308
3	RUL Gasoline	1956	50	47.5	693,000	620,760	70,098
4	Diesel	1990	50	48	672,000	630,966	69,594
5	Fuel Oil	1956	50	47.7	693,000	648,438	27,804
6	NRLM Fuel Oil	1956	50	48	693,000	650,370	27,300
7	TRANSMIX	1990	80	51.5	1,932,000	1,597,344	255,612
8	Premium Gasoline	1964	42.5	40	420,000	365,358	40,992
9	Ethanol	1956	25	36.5	132,300	109,746	19,404
10	Fuel Oil	1964	35	32	226,800	197,190	13,986
11	Fuel Oil	1964	35	32	226,800	197,190	13,986
				TOTALS :	6,717,900	5,925,570	643,104

Additive, Dye, and Water Storage						
Tank No.	Product Stored	AST Year Built	Diameter (in.)	Height (in.)	Length (in.)	Fill Capacity (gal.)
12	NEMO 1118	1980	108	276		14,994
13	Lubricity 2115 SD	2005	32	32	72	1,001
14	BK-50 Red Dye	2004	48	48	74	588
15	KEROPUR-AP 205-20	2008	48	48	129	1,010
					TOTALS :	17,593

13. **Ambient Water Quality Information**:
Water quality data from monitoring station 2-JMS104.16 are attached. The station is located on the James River at Buoy 166, which is approximately 2 miles downstream of the outfall (see **Attachment B**).

14. **Antidegradation Review & Comments**: Tier 1 **X** Tier 2 _____ Tier 3 _____
The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect those uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The anti-degradation review begins with a Tier determination. The river is considered a Tier 1 water. The Richmond-Crater Water Quality Management Plan allocates BOD and ammonia in order to maintain a minimum dissolved oxygen of 5.0 mg/L in the river. (See **Attachment C** for Flow Frequency Memorandum by Jennifer V. Palmore, P.G. dated February 4, 2011)

15. **Site Inspection**: Date: July 9. 2009
Performed by: Mike Dare (See **Attachment D**)

16. **Effluent Screening & Limitation Development**:

Table 2: Basis for Permit Limitations
Outfall 002: Maximum Monthly Average Flow: 0.73 MGD (see DMR data, **Attachment E**)

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		MO. AVE.	WE. AVE.	MIN.	MAX.	FREQ.	SAMPLE TYPE
Flow (MGD)	NA	NA	NA	NA	NL	1 per Month	Estimate
Total Petroleum Hydrocarbons (TPH)	2	NA	NA	NA	15 (mg/L)	1 per Month	Grab
pH	1	NA	NA	6.0 (SU)	9.0 (SU)	1 per Month	Grab
Total Organic Carbon (TOC)	2	NA	NA	NA	110 (mg/L)	1 per Month	Grab

Basis for Effluent Limitations
1. Water Quality Standards
2. Best Professional Judgment (Technology Based)

Additional Information: Limitations and/or Monitoring

Total Petroleum Hydrocarbons (TPH):
The 2012 permit limitation for TPH is based on Best Professional Judgment in accordance with current agency guidance (Permit Manual, Section IN-5, Pg.5). Please note that the required test methods for TPH include both GRO (gasoline range organics) and DRO (diesel range organics) for the 2012 permit. This change is being made in order to account for the combination of petroleum products, including gasoline and non-gasoline products, that may be stored onsite.

pH:
The pH limit is derived from 9 VAC 25-260-50 (Water Quality Standards) for discharges to Class II or Class III waters in the Piedmont and Coastal Zones.

Total Organic Carbon (TOC):
The limitation for TOC is carried over from the 2006 permit reissuance to the 2012 permit reissuance because the permittee has previously demonstrated compliance with this limit and therefore it cannot be removed due to antibacksliding policies. The TOC limitation originates from previous agency guidance for permitting of Bulk Oil Storage Facilities (Permit Manual, issued July 1995, Appendix IN – Industrial, Part F.2.d). TOC is also required to be monitored for discharges associated with hydrostatic testing in the *General Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests* (VAG83), and serves as an indicator parameter for non-petroleum organic substances (see GM08-2006 Fact Sheet, Pg. 17).

Whole Effluent Toxicity (WET) Monitoring
Whole Effluent Toxicity monitoring is being carried forward from the 2006 to the 2012 permit cycle in accordance with 9 VAC 25-31-210 and 220 I. of the VPDES Permit Regulation and BEJ. The acute endpoints have become slightly more stringent for the 2012 re-issuance due to higher effluent flows. An evaluation was conducted using the program WETLIM10.exe in order to produce an acute WLA. The WET testing results from 2006-2010 for this facility were then compared against these WLA's using the STATS2.0.4 program. It was determined that no limitations were required (see **Attachment E** for WETLIM10 and STATS 2.0.4 printout, as well as guidance from OWP&CA)

Additional Information: EPA Form 2C and Attachment A Screening

Effluent testing results submitted by the permittee for EPA Form 2C and Attachment A have been summarized in **Attachment F** of this fact sheet.

Table 3 below represents a summary of those effluent sample test results that met one or both of the following criteria: a) the Quantitative Limit (QL) calculated by the laboratory was greater than the minimum QL recommended by DEQ for that parameter, or b) test results indicated a concentration greater than the QL used by the laboratory. Table 3 also summarizes the results of the screening evaluations conducted for each pollutant.

Table 3: EPA Form 2C and Attachment A Screening

POLLUTANTS OF CONCERN						
CHEMICAL	QUANTIFICATION LEVEL (µg/L)		REPORTING RESULTS (µg/L)	Effluent Concentration Used for DEQ Evaluation (µg/L)	Evaluation Type	Limitation or Monitoring Needed?
	Recommended	Used				
Antimony, dissolved	1.4	5	<5	5	2	NO
Arsenic, dissolved	1.0	5	<5	5	1,2	NO
Chromium III, dissolved	3.60	10	<10	10	1,2	NO
Chromium VI, dissolved	1.60	5	<5	5	1	NO
Copper, dissolved	0.50	3	8.6	8.6	1,2	NO
Lead, dissolved	0.50	2	<2	2	1,2	NO
Nickel, dissolved	0.94	3	<3	3	1,2	NO
Selenium, tot.recoverable	2.0	3	<3	3	1,2	NO
Silver, dissolved	0.20	0.5	<0.5	0.5	1	NO
Zinc, dissolved	2.0	10	43.8	43.8	1,2	NO
DDT	0.1	0.25	<0.25	0.25	1,2	NO
Chlorine, Total Residual	100	?	1300	1300	1	YES ‡
Total Dissolved Solids	--	10000	35000	35000	2	NO
Nitrate-Nitrite	--	100	390	390	2	NO
Total Barium	--	10	16.3	16.3	2	NO
Total Iron	--	10	139.1	139.1	2	NO
Total Magnesium	--	10	276.8	276.8	2	NO
Total Calcium	--	50	2960	2960	3	NO

Evaluation Types:
1) Water Quality Standards - Aquatic Life Evaluation (see below)
2) Water Quality Standards - Human Health Criteria Evaluation (see below)
3) No Base Value Available for Comparison

Water Quality Standards - Aquatic Life Evaluations: If it is determined that a specific pollutant may exist in a facility's effluent, a reasonable potential analysis must be conducted in order to determine if it is statistically probable that future discharges may contain that pollutant in concentrations which are harmful to the aquatic life within the receiving stream. The first step of the analysis is determining the maximum concentration that may be discharged by the facility which will maintain the instream acute and chronic criteria contained in the *Virginia Water Quality Standards* (9 VAC 25-260 et.seq.). This maximum allowable pollutant concentration, called a wasteload allocation (WLA), is determined using a DEQ-created Excel spreadsheet deemed MSTRANTI, which requires inputs representing critical flow & water quality data for both the effluent and the receiving stream. The second step of the analysis utilizes another computer application, named STATS 2.0.4, to calculate the lognormal distribution of the identified pollutant concentration using data submitted by the permittee as a sample set. The average and maximum 97th percentiles of the distribution are calculated, and then compared to the WLA's determined earlier. If the 97th percentiles exceed the WLA's, a limitation is deemed to be necessary. If a permit limitation is necessary, the STATS 2.0.4 also calculates the limit based on EPA-guidelines for the control of toxic pollutants. The MSTRANTI spreadsheet and applicable STATS 2.0.4 results for those pollutants of concern listed in Table 3 above are contained in **Attachment G** of this fact sheet.

‡ -*Total Residual Chlorine (TRC)*: A single data point of 1.3 mg/L was reported with the application. The permittee submitted 5 additional data points on 3/25/2011 representing samples taken on 3/21/2011. The additional samples were tested in the field using HACH DPD Method 8167 for Total Residual Chlorine, which has a detection range of 0.02 mg/L – 2.0 mg/L. A Reasonable Potential Analysis utilizing the additional data indicates that a limitation for TRC is not

required. Please see **Attachment G** for the STATS evaluation, which includes a description of how the new TRC data were evaluated.

Water Quality Standards - Human Health Criteria Evaluation: Pollutants which do not have Aquatic Life water quality criteria are compared directly against applicable Human Health criteria. Since the receiving stream to which this facility discharges is not considered a Public Water Supply (PWS) segment, only the respective "All Other Surface Waters" Human Health criteria listed in 9 VAC 25-260-140 B. were used to determine if further evaluation is required. PWS Human Health Criteria were also listed for informational purposes. Except where noted, the effluent pollutant concentrations used for evaluation were compared directly to the respective Human Health criteria without accounting for ambient 30Q5 or Harmonic Mean dilutions of the facility's effluent.

Table 4: Human Health Criteria Screening

HUMAN HEALTH CRITERIA SCREENING				
CHEMICAL	**Value Used for DEQ Evaluation (µg/L)**	**All Other Surface Waters Human Health Criteria (µg/L)**	**PWS Human Health Criteria (µg/L)**	**Further HH Evaluation Required?**
Antimony, dissolved	5	640	5.6	NO
Arsenic, dissolved	5	--	10	NO
Chromium III, dissolved	10	--	100 (total)	NO
Copper, dissolved	8.6	--	1300	NO
Lead, dissolved	2	--	15	NO
Nickel, dissolved	3	4600	610	NO
Selenium, T.Recoverable	3	4200	170	NO
Zinc, dissolved	43.8	26000	7400	NO
DDT	0.25	6.4*	6.4*	NO
Total Dissolved Solids	35000	--	500000	NO
Nitrate-Nitrite	390	--	10000	NO
Total Barium	16.3	--	2000 (dissolved)	NO
Total Iron	139.1	--	300 (dissolved)	NO
Total Magnesium	276.8	--	50 (dissolved)	NO

* Represents the Human Health Wasteload Allocation calculated in accordance with GM00-2011 (Pg. 84-86, section for development of Human Health Standards for Carcinogens)

Additional Information: Relationship to *General Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests* (VAG83)

Table 5a: VAG83 Comparison – Petroleum Products

VAG 83 General Permit Limitations for Contamination from Petroleum								Kinder Morgan 2011 Application Testing	Pollutant Description
Pollutant	Freshwater Receiving Stream				Saltwater Receiving Stream		Hydro-static Test Waters		
	Gasoline		Non-Gasoline						
	PWS	Non-PWS	PWS	Non-PWS	Gasoline	Non-Gasoline			
Naphthalene (µg/L)			10	10		8.9		<10	Indicator of non-gasoline petroleum contamination
Benzene (µg/L)	12	50	12		50			<10	Indicator of gasoline contamination, sometimes found in non-gasoline products during pipeline mixing.
MTBE (methyl tert-butyl ether) (µg/L)	15	1840	15		440			Not tested	Additive to gasoline, sometimes found in non-gasoline products during pipeline mixing.
Total Petroleum Hydrocarbons (TPH, mg/l)			15			15	15	3.74 (5 yr. max. avg.)	Indicator of non-gasoline petroleum contamination
Toluene (µg/L)	175				500			<10	Indicator of gasoline contamination
Ethylbenzene (µg/L)	320				4.3			<10	Indicator of gasoline contamination
Total Xylenes (µg/L)	33				74			<10	Indicator of gasoline contamination
Total Recoverable Lead (µg/L)	Lower of: $e^{(1.273(\ln \text{hardness})) - 3.259}$ or 15				8.5			<2	Additive to gasoline
Ethylene Dibromide (µg/L)	0.169	5.3			5.3			Not tested	Additive to gasoline
Ethanol (µg/L)	4100				4100			<80	Additive to gasoline
Total Residual Chlorine (TRC, mg/l)							0.011	see STATS evaluation	Limited for hydrostatic test discharges
1,2 Dichloroethane (µg/L)	3.8	990			990			Not tested	Additive to gasoline
Total Organic Carbon (TOC, mg/L)							NL	8.06	Indicator of non-gasoline petroleum contamination
Hardness (mg/L)	NL				NL			Not tested	Monitored to determine lead limitations

Since this facility receives, stores, and distributes both gasoline and non-gasoline petroleum products, it is necessary to compare those data submitted with the application to constituents named as indicators of contamination of both gasoline and non-gasoline products in the VAG83 general permit fact sheet.

Elevated levels of benzene, toluene, ethylbenzene, and xylenes (BTEX) are considered to be indicators of gasoline contaminated water, according to GM08-2006 (Fact Sheet, Section 6.1, Page 6). Kinder Morgan tested for each of these parameters, and test results indicated that none were present above QLs which are less than the respective limitations found in the VAG83 general permit. Several pollutants that are gasoline additives, including Lead and Ethanol, were also tested by Kinder Morgan, and results were the same. Other gasoline additives that were not tested by the permittee include MTBE, Ethylene Dibromide, and 1,2 Dichloroethane. For the purposes of this permit reissuance, gasoline contamination is not considered to have occurred onsite due to the fact that elevated levels of the indicator parameters BTEX were not observed. Therefore, further monitoring and/or limitations for parameters limited in the VAG83 general permit for gasoline contaminated sites is not warranted during the 2012 permit cycle.

Elevated levels of naphthalene, TPH, and TOC are considered to be indicators of non-gasoline petroleum contaminated waters, according to GM08-2006 (Fact Sheet, Section 6.2.3, Page 16). Naphthalene was tested for the 2012 permit reissuance application, and results concluded that it was not present in levels which exceed the limitations found in the VAG83 general permit. The permittee has also complied with the 2006 permit Limitations for TPH and TOC. Consequently, for the purposes of this permit reissuance, non-gasoline petroleum product contamination is not considered to have occurred onsite, and therefore, further monitoring and/or limitations for parameters limited in the VAG83 general permit for non-gasoline contaminated sites is not warranted during the 2012 permit cycle.

Please note the new 2012 permit requirement that this facility test for both gasoline range organics (GRO) and diesel range organics (DRO) when determining compliance with the permittee's limitation for Total Petroleum Hydrocarbons (TPH). Testing for both GRO and DRO ranges will aid in determining whether future petroleum contamination, if present, may be attributed to either or both gasoline and/or non-gasoline product.

Table 5b: VAG83 Comparison – Chlorinated Hydrocarbon Solvents

General Permit Limitations for Contamination from Chlorinated Hydrocarbon Solvents		**Kinder Morgan 2011 Application Test Results**
Pollutant	**All Surface Waters**	
1,1 Dichloroethane (µg/L)	4	Not tested
Chloroform (µg/L)	100	<10
1,2 Dichloroethane (µg/L)	3.8	<10
1,1 Dichloroethylene (µg/L)	7	<10
cis-1,2 Dichloroethylene (µg/L)	70	Not tested
trans-1,2 Dichloroethylene (µg/L)	100	<10
Methylene Chloride (µg/L)	5	<20
Tetrachloroethylene (µg/L)	5	<10
1,1,1 Trichloroethane (µg/L)	112	Not tested
1,1,2 Trichloroethane (µg/L)	5	<10
Trichloroethylene (µg/L)	5	<10
Vinyl Chloride (µg/L)	2	<10
Carbon Tetrachloride (µg/L)	2.5	<10
1,2 Dichlorobenzene (µg/L)	15.8	Not tested
Chlorobenzene (µg/L)	3	<10
Trichlorofluoromethane (µg/L)	5	Not tested
Chloroethane (µg/L)	3	Not tested

The Kinder Morgan Transmix Co., LLC facility does *not* receive, store, or distribute chlorinated hydrocarbon solvents, and therefore, those constituents limited in the VAG83 general permit and listed in

Table 5b above are not expected to be present in the facility's effluent. No further evaluation or monitoring is required.

Additional Information: Watershed Nutrient General Permit

This facility is authorized to discharge total nitrogen and total phosphorus in accordance with 9 VAC 25-820-70.A.2 of the *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. During promulgation of Virginia's *Water Quality Management Plan Regulation* (9 VAC 25-720), this facility was identified as a non-significant discharger according to the definition in the regulation, and therefore the permittee did not receive site specific nutrient load allocations. Existing facilities that were not identified as significant dischargers may, nonetheless, be required to register under the Watershed Nutrient General Permit (and consequently receive individual nutrient load allocations) if the facility has undergone a design flow expansion (municipal dischargers), or has increased its delivered nutrient load to levels that are equivalent to a design flow expansion (industrial dischargers) as outlined in § 62.1-44.19:15 (*Code of Virginia*), and 9 VAC 25-40-70 (*Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed*).

For industrial dischargers, agency guidance (GM07-2008 Amd.2, Page 10) asserts that an increase in effluent flow volume should not be used to determine whether there has been an increase in delivered nutrient load from a facility unless the flow rate increase is directly associated with capital construction improvements requiring a Concept Engineering Report. Since Kinder Morgan has not undergone an expansion or upgrade, the permittee is not required to register under the Watershed Nutrient General Permit, and an evaluation of the facility's delivered nutrient load is not required.

17. **Antibacksliding Statement** : All limits in the 2012 permit are at least as stringent as the 2006 permit.

18. **Part I Special Conditions**:

B1. Notification Levels
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 A for all manufacturing, commercial, mining, and silvicultural dischargers.

B2. Operation and Maintenance Manual
Rationale: Required by Code of Virginia § 62.1-44.16; VPDES Permit Regulation, 9 VAC 25-31-190 E, and 40 CFR 122.41(e). These require proper operation and maintenance of the permitted facility. Compliance with an approved O & M manual ensures this.

B3. Materials Handling and Storage
Rationale: 9 VAC 25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia § 62.1-44.16 and 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

B4. Compliance Reporting
Rationale: Authorized by VPDES Permit Regulation, 9 VAC 25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also established protocols for calculation of reported values.

B5. Oil Storage Ground Water Monitoring Reopener
Rationale: Facilities with greater than 1,000,000 gallons of regulated aboveground petroleum storage are required to monitor ground water under the *Facility and Aboveground Storage Tank Regulation* (9 VAC 25-91-10 et seq.). Where potential exists for ground water pollution and that regulation does not require monitoring, the VPDES permit may contain groundwater monitoring under Code of Virginia § 62.1-44.21.

B6. Whole Effluent Toxicity (WET) Monitoring
Rationale: VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. WET testing requirements and language were provided by OWP&CA.

B7. Total Maximum Daily Load (TMDL) / Nutrient Reopener
Rationale: Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed it they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act. 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9 VAC 25-31-390.A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

B8. Water Quality Criteria Reopener
Rationale: VPDES Permit Regulation, 9 VAC 25-31-220 D requires effluent limitations to be established which will contribute to the attainment or maintenance of the water quality standards.

B9. Monthly Sampling Requirements
Rationale: The intermittent frequency with which this facility discharges may prevent a sampling event from occurring on a minimum basis of once per month as is indicated by the minimum monitoring requirements for Flow, pH, and TOC in Part I.A.1.a of the 2012 permit. Therefore further sampling instructions have been added in this special condition for months in which no discharge occurs in order that the permittee remains consistent with previous sampling practices and current agency policy.

B10. Treatment Works Closure Plan
Rationale: Code of Virginia § 62.1-44.16 of the State Water Control Law. This condition establishes the requirement to submit a closure plan for the wastewater treatment facility if the treatment facility is being replaced or is expected to close.

B11. Best Management Practices (BMP)
Rationale: VPDES Permit Regulation, 9VAC25-31-220 K, requires use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limit or to carry out the purpose and intent of the Clean Water Act and State Water Control Law.

B12. Concept Engineering Report (CER)
Rationale: § 62.1-44.16 of the Code of Virginia requires industrial facilities to obtain DEQ approval for proposed discharges of industrial wastewater. A CER means a document setting forth preliminary concepts or basic information for the design of industrial wastewater treatment facilities and the supporting calculations for sizing the treatment operations.

Part II, Conditions Applicable to All Permits
Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

19. **NPDES Permit Rating Work Sheet**: Total Score: 23 (see **Attachment H**)

20. **Changes to Permit:**

Table 6: Changes to Part I.A. Effluent Limitations and Monitoring Requirements

Parameter Changed	Effluent Limits Changed		Monitoring Requirement Changed		Reason for Change	Date
	From	To	From	To		
TPH	15 mg/L	No Change	1 / 3 Months	1 per Month	Monitoring frequency changed to match frequency for other limitations in permit.	8/12
TOC	110.0 mg/L	110 mg/L	1/Month	1 per Month	Limitation expressed as two significant figures in accordance with GM06-2016. Expression of monitoring frequency changed in accordance with regional preference.	3/11
pH	6.0 – 9.0 SU	No Change	1/Month	1 per Month	Expression of monitoring frequency changed in accordance with regional preference.	8/12

Table 7: Changes to Special Conditions and Other Changes

From	To	Special Condition Changed	Rationale
Cover Page	Cover Page	--	The structure and language of the cover page have been modified in accordance with new agency procedures and for streamlining purposes. Signatory requirements have also changed in accordance with the October 2008 DEQ Agency Policy Statement 2-09, "Delegations of Authority". Additionally, the receiving stream special standards has changed from "None" to "bb" in accordance with current Water Quality Standards (rev. January 6, 2011)
Part I.A.1	Part I.A.1	Limitations & monitoring preamble.	Part I.A structure and language revised for acuity purposes.
--	Part I.A.1(a)	Significant Figures	New, reflects changes made in agency procedure due to GM06-2016
--	Part I.A.1(b)	TPH Analysis Requirements	New, reflects most recent TPH analysis procedures required in accordance with the *General VPDES Permit for Petroleum Contamination Sites, Groundwater Remdiation, and Hydrostatic* Tests (9 VAC 25-120
--	Part I.A.1(c)	Monthly Sampling special condition reference	New, added for clarity purposes relating to monthly monitoring requirements.
--	Part I.A.1(d)	Compliance Reporting special condition reference	New, added for acuity purposes
Part I.A.3	Part I.A.2	Effluent Sample Location	No change
Part I.A.2	Part I.A.3	Visible Effluent Quality	New, added prohibition of discharge of water with visible sheen.
--	Part I.A.4	Tank Bottom Waters-No Discharge	New, added in accordance with current agency guidance (Permit Manual, Section IN-5 , Pg. 3, rev. 1/27/2010)

Table 7: Changes to Special Conditions and Other Changes

From	To	Special Condition Changed	Rationale
--	Part I.A.5	WET Monitoring special condition reference	New, added for acuity purposes
Part I.B.1	Part I.B.1	Notification Levels	Revised threshold value for Antimony to reflect 2 significant figures
Part I.B.4	Part I.B.2	Operations & Maintenance Manual	Revised to reflect 4/3/2012 boilerplate developed by OWP&CA.
Part I.B.2	Part I.B.3	Materials Handling & Storage	Revised to require consistency with Best Management Practices.
Part I.B.3.	Part I.B.4.	Compliance Reporting Under Part I.A	Language revised for clarity and in accordance with current agency guidance (Permit Manual, Section IN-3 , Pg. 15, rev. 1/27/2010) and PRO regional standard. Reporting instruction language pertaining to significant digits revised in accordance with GM06-2016 and current agency standard language.
Part I.B.8	Part I.B.5	Oil Storage Groundwater Monitoring Reopener	No Change
Part I.C	Part I.B.6	Whole Effluent Toxicity (WET) Monitoring	Language and endpoints revised in accordance with guidance from OWP&CA and WET evaluation conducted for 2012 permit reissuance.
Part I.B.5 / Part I.B.11	Part I.B.7	Nutrient/TMDL Reopener	Language revised to reflect current agency guidance (GM07-2008). Revised language addresses both nutrient reopener and TMDL reopener.
--	Part I.B.8	Water Quality Criteria Reopener	New, added to clarify that DEQ may reopen the permit and impose water quality limits if effluent monitoring indicates that it is necessary to do so.
--	Part I.B.9	Monthly Monitoring Requirements	New, added to clarify monthly monitoring requirements due to the intermittent nature of the facility's discharge.
Part I.B.10	Part I.B.10	Treatment Works Closure Plan	Language revised in accordance with current agency guidance (Permit Manual, Section IN-3 , Pg. 19, rev. 1/27/2010).
Part I.B.6	Part I.B.11	BMP Plan	Language reflects current agency guidance (Permit Manual, Section IN-3, Pg. 6, rev. 1/27/2010).
--	Part I.B.12	Concept Engineering Report	Added in accordance with 6/29/2010 regional staff, and 7/22/2010 water program manager decision to include this special condition in all industrial VPDES individual permits (see Item 18 of this fact sheet for further information).
Part I.A.4	REMOVED	Reference to Hydrostatic Test Waters special condition requirements	Hydrostatic test discharge requirements have been removed from the 2012 permit. Authorization to discharge hydrostatic test waters may be granted by DEQ with coverage under 9 VAC 25-120 et.seq. (*General VPDES Permit for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests*). On 9/30/2011, the permittee affirmed via email that obtaining coverage under this general permit for hydrostatic test discharges is acceptable and preferred to the individual permit.
Part I.B.7		Discharge of Hydrostatic Test Water Special Condition	
Part I.B.9	REMOVED	Water Quality Standards Testing	Removed, the permittee submitted all required Water Quality Standards testing with the application for the 2012 permit reissuance. Additional testing is not necessary.

21. **Variances/Alternate Limits or Conditions**: None

22. **Public Notice Information required by 9 VAC 25-31-280 B**:

Comment period: Start Date: October 3, 2012 End Date: November 5, 2012
Published Dates: October 3, 2012 and October 10, 2012
Name of Newpaper: *Style Weekly*

All pertinent information is on file and may be inspected or copied by contacting Jeremy Kazio at:

Virginia Department of Environmental Quality (DEQ)
Piedmont Regional Office
4949-A Cox Road
Glen Allen, Virginia 23060-6296

Telephone Number 804/527-5044
Facsimile Number 804/527-5106
Email Jeremy.Kazio@deq.virginia.gov

DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for public hearing, and there are substantial, disputed issues relevant to the permit. The public may review the draft permit and application at the DEQ Piedmont Regional Office by appointment or may request copies of the documents from the contact person listed above.

23. **Additional Comments**:

Previous Board Action: None

Staff Comments:

a. *Monitoring Frequency Reduction:* A reduction in monitoring frequency was not considered for this permit reissuance due to the intermittent nature of the permittee's discharge.

b. *Storm Water Requirements:* The permittee's SIC Code (5171) is included under Sector P of DEQ's industrial storm water management requirements. However, only those facilities within this sector which conduct vehicle and equipment rehabilitation, mechanical repairs, painting, fueling and lubrication, and/or equipment cleaning operations are required to manage storm water runoff under the industrial storm water program. This permittee does not practice any vehicle maintenance or fueling or equipment cleaning onsite, and therefore, the facility is not subject to the industrial storm water management requirements.

c. *Permit Expiration Prior to Reissuance:* This permit is being reissued subsequent to expiration due to delayed application submittal and administrative delays.

d. *Hydrostatic Testing:* The permittee may handle, store, and distribute a variety of gasoline and non-gasoline petroleum substances at this facility. In addition to being required by law to conduct hydrostatic testing on their AST's, the permittee may need to conduct hydrostatic testing on pipelines or tanks when the products are switched due to density differences between products. DEQ staff contacted the permittee by email on 9/30/2011 and inquired whether the permittee preferred to keep hydrostatic testing requirements in their individual permit, or if they'd prefer the option to obtain general permit coverage under 9 VAC 25-120 et.seq. (*General VPDES Permit*

for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests) for authorization to discharge hydrostatic test waters. The permittee responded the same day indicating that they'd prefer to obtain coverage under the general permit. Consequently the hydrostatic testing requirements formerly included in past permit reissuances were removed from the 2012 permit reissuance prior to public notice.

e. *Outfall Relocation:* The permit was modified in April 2005 to relocate the outfall. Outfall 001 formerly discharged to a tributary of the James River, whereas the new Outfall 002 discharges directly to the James River. In relocating the outfall, several metals limitations were removed from the 2006 permit.

f. *VDH-Office of Drinking Water:* The Virginia Department of Health – Office of Drinking Water indicated no objection to the existing discharge. Coordination with DCR's Division of Natural Heritage indicated that the current activity will not affect any documented State-listed plants or insects (see **Attachment I**)

g. This permit reissuance is non-controversial. The staff believes that the attached effluent limitations will maintain the Water Quality Standards adopted by the Board.

h. *Planning Concurrence:* The discharge is in conformance with the existing planning documents for the area.

i. *EPA Comments:* EPA has waived the right to comment and/or object to the adequacy of the permit.

j. *Permit Fees:* The permittee is current on payment of their annual maintenance fee last paid on September 18, 2012

k. *E-DMR Status:* The permittee is an e-DMR participant beginning 11/16/2010. The permittee does not participate in the Virginia Environmental Excellence Program (VEEP).

l. *Local Government Notification of Public Notice:* A copy of the public notice for the 2012 permit reissuance was mailed to the Richmond Regional Planning District Commission (RRPDC), the Richmond City Mayor, and the President of the Richmond City Council on October 1, 2012. The RRPDC replied with the following comments: "RRPDC staff support permit issuance and the continued success of businesses in the City of Richmond along the James River. RRPDC also wish to underscore the importance of clean water in the James River watershed given the existing bacteria TMDL as well as the larger Chesapeake Bay TMDL for sediment, nitrogen, and phosphorus."

24. **Public Comment**: No comments received

25. **303(d) Listed Segments (TMDL)**:

During the 2010 305(b)/303(d) Water Quality Assessment, the segment was assessed as a Category 5A water. The Aquatic Life Use is impaired due to inadequate submerged aquatic vegetation (SAV), exceedance of the chlorophyll a criteria, and violation of the 30-day mean Open Water summer dissolved oxygen criteria. The Recreation Use is impaired due to E. coli. The Fish Consumption Use is impaired due to a VDH fish advisory for PCBs; in addition, mercury and kepone are considered non-impairing observed effects. The Wildlife Use is fully supporting.

The bacterial TMDL for the James River was approved by the EPA on 11/4/2010. Kinder Morgan was included in the TMDL; however it was determined that they do not need a wasteload allocation because their current permit does not require fecal coliform control. Please see the Flow Frequency and 303(d) Status Determination memorandum in **Attachment C**

a. *Chesapeake Bay TMDL:* This facility discharges directly to the James River in the Chesapeake Bay watershed in segment JMSTF2. The receiving stream has been addressed in the Chesapeake Bay TMDL, approved by EPA on December 29, 2010. The TMDL addresses

dissolved oxygen (DO), chlorophyll a, and submerged aquatic vegetation (SAV) impairments in the main stem Chesapeake Bay and its tidal tributaries by establishing non-point source load allocations (LAs) and point-source waste load allocations (WLAs) for Total Nitrogen (TN), Total Phosphorus (TP) and Total Suspended Solids (TSS) to meet applicable Virginia Water Quality Standards contained in 9VAC25-260-185.

Implementation of the Chesapeake Bay TDML is currently accomplished in accordance with the Commonwealth of Virginia's Phase I Watershed Implementation Plan (WIP), approved by EPA on December 29, 2010. The approved WIP recognizes the "General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed of Virginia" (9VAC25-820) as controlling the nutrient allocations for non-significant Chesapeake Bay dischargers. The approved WIP states that for non-significant Municipal and Industrial facilities, nutrient WLAs are to be consistent with Code of Virginia procedures, which set baseline WLAs to 2005 permitted design capacity nutrient load levels. In accordance with the WIP, TN and TP WLAs for non-significant facilities are considered aggregate allocations and will not be included in individual permits. The WIP also considers TSS WLAs for non-significant facilities to be aggregate allocations, but TSS limits are to be included in individual VPDES permits in conformance with the technology-based requirements of the Clean Water Act. The discharge from this facility's industrial processes is not governed by any Parts of Title 40, Chapter I, Subchapter N (Federal Effluent Guidelines) of the Code of Federal Regulations, and therefore, a technology-based TSS limitation is not required. However, the WIP recognizes that so long as the aggregated TSS permitted loads for all dischargers is less than the aggregated TSS load in the WIP, the individual permit will be consistent with the TMDL. The discharge from this facility was included in the JMSTF2 aggregated TSS permitted load.

40 CFR 122.44(d)(1)(vii)(B) requires permits to be written with effluent limits necessary to meet water quality standards and to be consistent with the assumptions and requirements of applicable WLAs. This facility is classified as a Non-significant Chesapeake Bay discharger because it has a permitted design capacity flow, or equivalent load, of less than 100,000 gallons per day into tidal waters. This facility has not made application for a new or expanded discharge since 2005. It is therefore covered by rule under the 9VAC25-820 regulation. In accordance with the WIP, TN and TP load limits are not included in this individual permit, but are consistent with the TMDL because the current nutrient loads are in conformance with the facility's 2005 permitted design capacity loads.

Implementation of the full Chesapeake Bay WIP, including GP reductions combined with actions proposed in other source sectors, is expected to adequately address ambient conditions such that the proposed effluent limits of this individual permit are consistent with the Chesapeake Bay TMDL, and will not cause an impairment or observed violation of the standards for DO, chlorophyll a, or SAV as required by 9VAC25-260-185. Additionally, effluent data submitted with the application for biochemical oxygen demand (< 2 mg/L) and chemical oxygen demand (<10 mg/L) indicates that this facility's discharge does not contribute to a significant oxygen demand on the receiving stream.

b. *E.coli:* The permittee submitted a single data point for E.coli reflecting 225 CFU/100mL. The source of effluent discharged from this facility is storm water runoff from the AST containment berm, loading racks, and Transmix process pad. The runoff is collected at these locations and is directed to a small retention pond, then released through an oil/water separator to the James River. There are no processes at this facility which contribute bacteria to the effluent, and all sanitary wastes are directed to public sewer. The containment berm and small retention pond have the potential for exposure to wildlife activity. Wildlife contribution is already accounted for in the non-point source load allocation in the abovementioned bacterial TMDL, and therefore, a permit limitation for E.coli is not necessary.

c. *Polychlorinated Biphenyl's (PCB's)*: The permittee submitted effluent data for all seven PCB arachlors required by Attachment A using the proper test method (608). All PCB arachlors were

reported less than the DEQ recommended QL (<1.0 µg/L). Therefore, this facility's discharge is not expected to cause or contribute to the PCB fish consumption impairment.

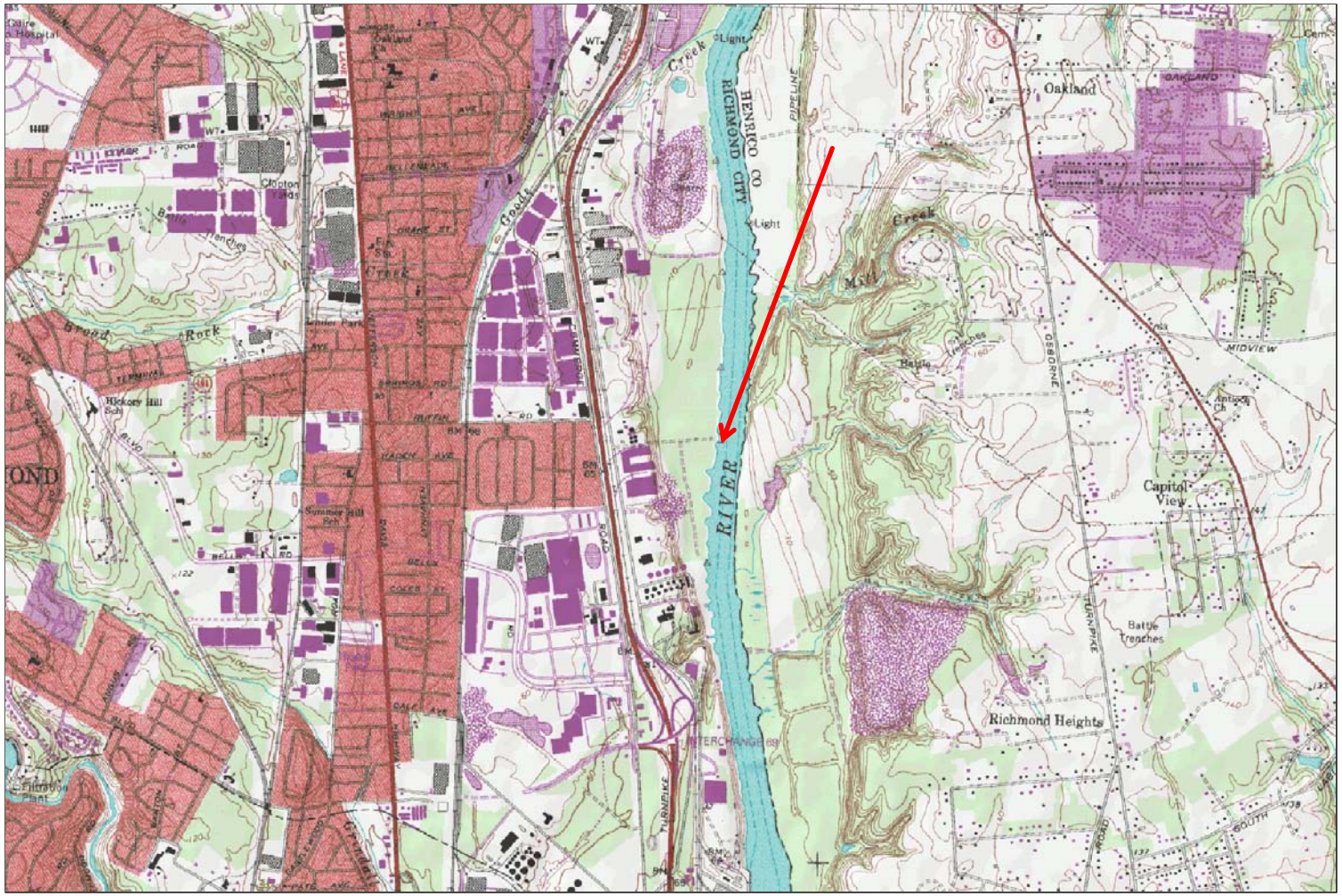
26. **Fact Sheet Attachment Guide**:

Attachment A	Facility Diagrams, Topographic Maps, & Aerial Photographs
Attachment B	Ambient Water Quality Data
Attachment C	Flow Frequency Memorandum, 303(d) List Fact Sheets
Attachment D	Site Inspection Report
Attachment E	WET Information
Attachment F	DMR Data & Summary of Testing Results for Attachment A and Form 2 C
Attachment G	Effluent Limitation Analyses
Attachment H	NPDES Permit Rating Worksheet
Attachment I	DCR Natural Heritage Review

Attachment A

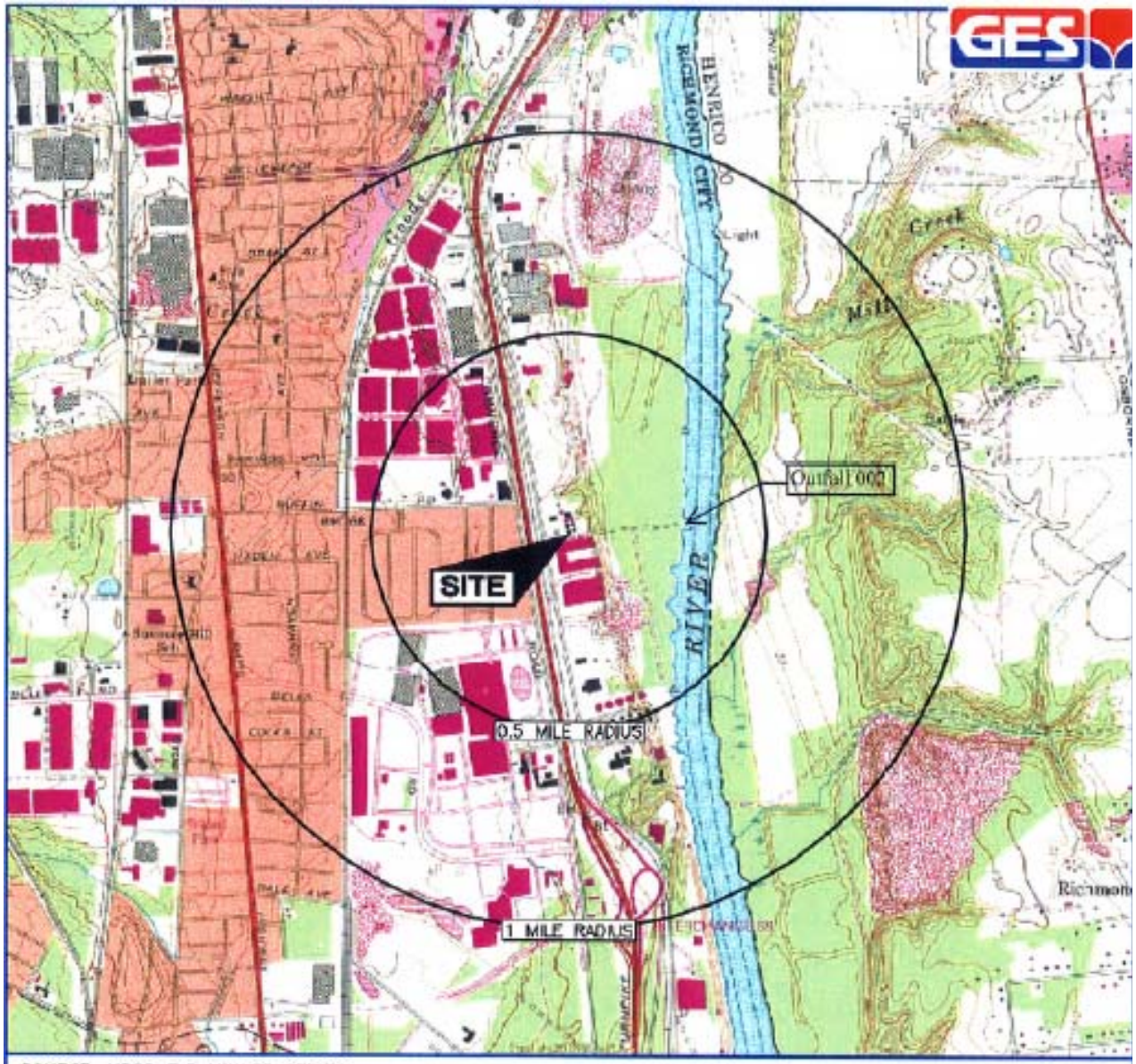
Facility Diagrams, Topographic Maps, & Aerial Photographs

Kinder Morgan Transmix Co., LLC: (VA0086151)



Map provided by MyTopo.com


Kinder Morgan
Operating LP"A"
Outfall 002
Deepwater Terminal Rd
Ruffin Rd
Ruffin Rd
Richmond
James
Mike Rd
Ave
95
Richmond-Petersburg Tpke
E Commerce
Deepwater Terminal Rd

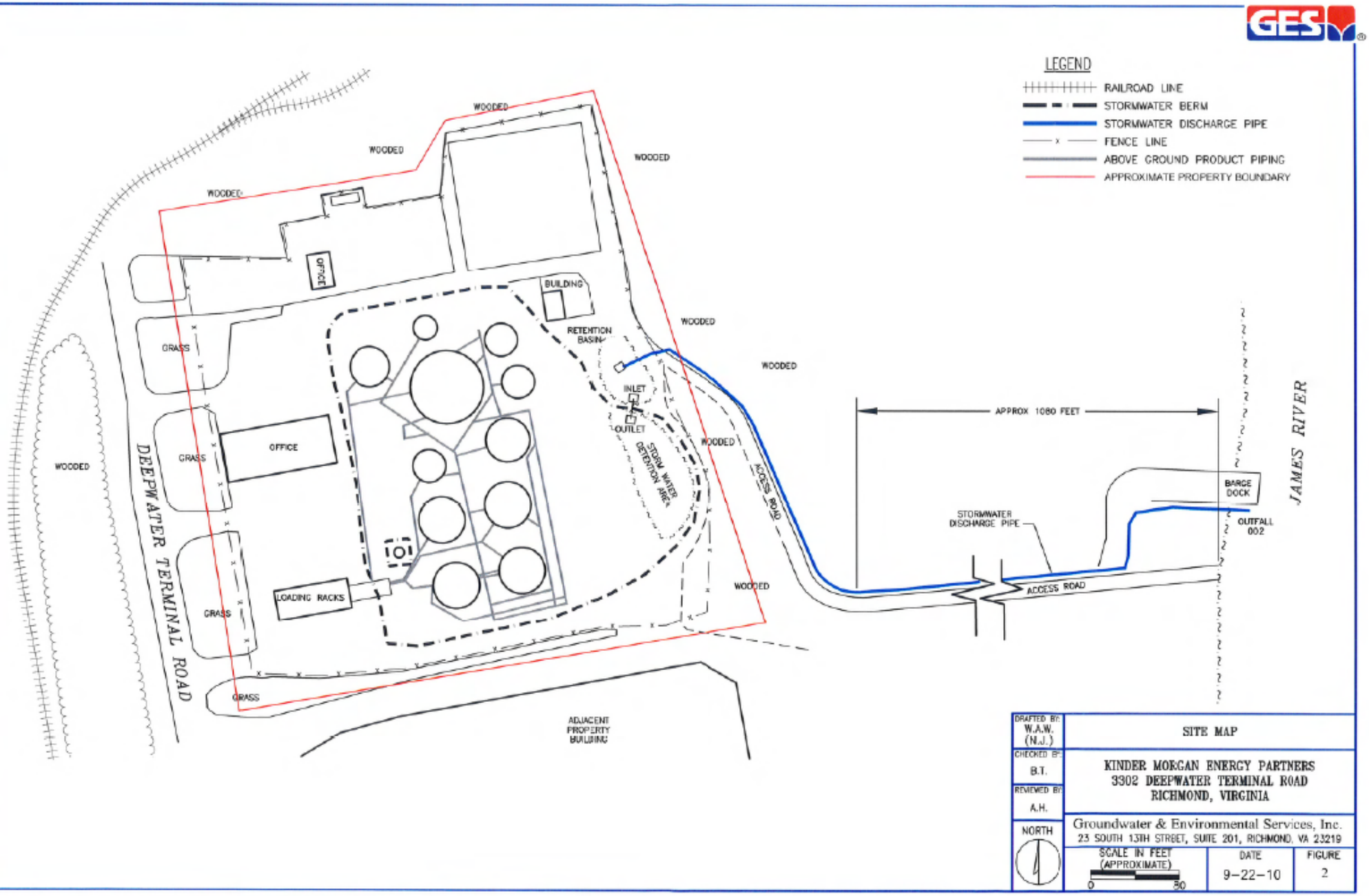


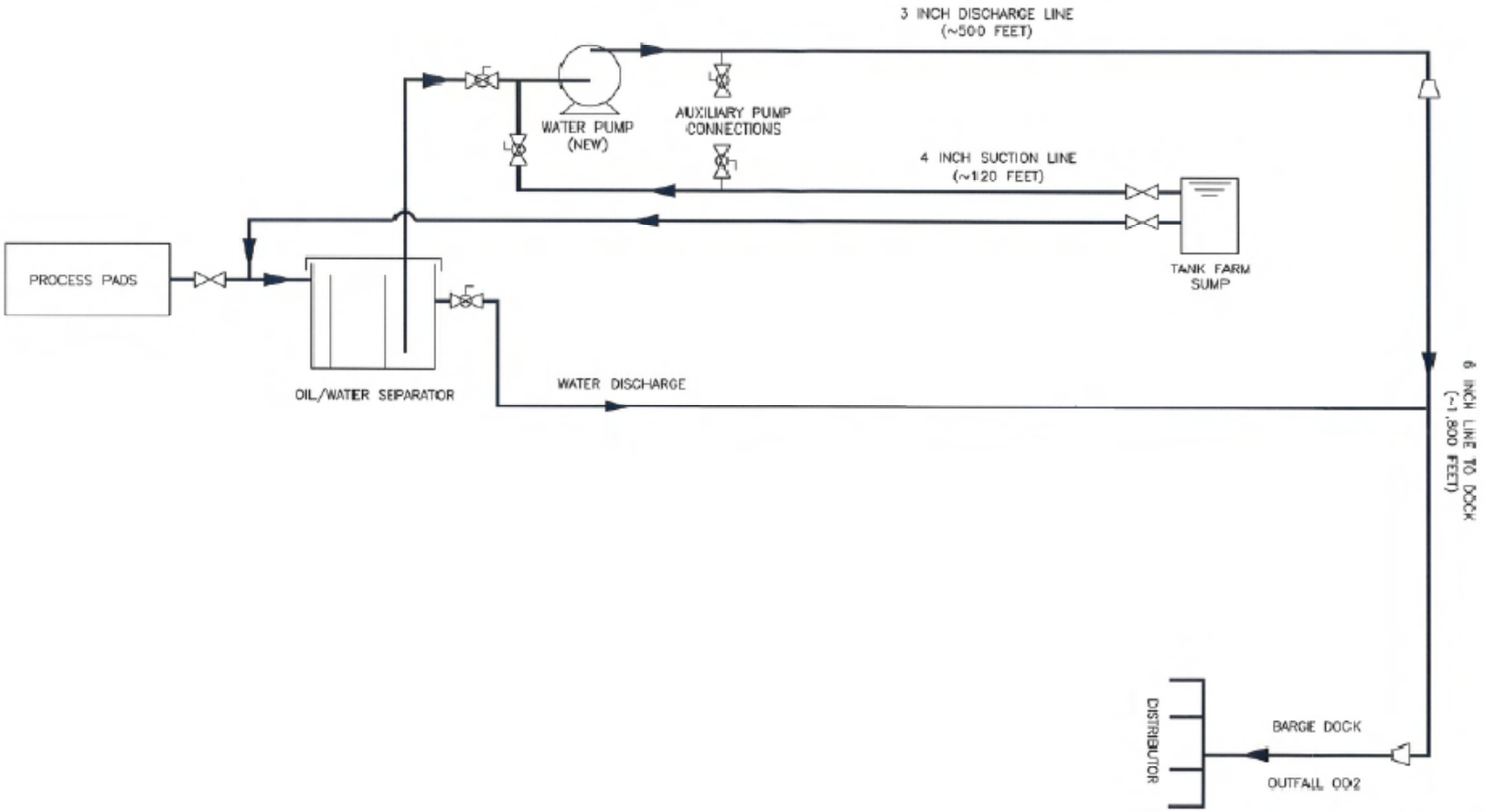
SOURCE: USGS 7.5 MINUTE SERIES
TOPOGRAPHIC QUADRANGLE 1994
DREWRY'S BLUFF, VIRGINIA
CONTOUR INTERVAL = 10'

QUADRANGLE LOCATION

LAT. 037° 28' 44.12" N
LONG. 077° 25' 42.69" W
(APPROXIMATE SITE COORDINATES)

DRAFTED BY: W.A.W. (N.J.)	SITE LOCATION MAP
CHECKED BY: B.T.	KINDER MORGAN ENERGY PARTNERS 3302 DEEPWATER TERMINAL ROAD RICHMOND, VIRGINIA
REVIEWED BY: A.H.	Groundwater & Environmental Services, Inc. 23 SOUTH 13th STREET, SUITE 201, RICHMOND, VA 23219
NORTH	SCALE IN FEET: 0 2000 / DATE: 9-22-10 / FIGURE: 1


LEGEND
RAILROAD LINE
STORMWATER BERM
STORMWATER DISCHARGE PIPE
FENCE LINE
ABOVE GROUND PRODUCT PIPING
APPROXIMATE PROPERTY BOUNDARY
WOODED
OFFICE
BUILDING
RETENTION BASIN
GRASS
INLET
OUTLET
STORM WATER DETENTION AREA
ACCESS ROAD
APPROX 1080 FEET
JAMES RIVER
BARGE DOCK
STORMWATER DISCHARGE PIPE
OUTFALL 002
DEEPWATER TERMINAL ROAD
LOADING RACKS
ADJACENT PROPERTY BUILDING
DRAFTED BY: W.A.W. (N.J.)
CHECKED BY: B.T.
REVIEWED BY: A.H.
NORTH
SITE MAP
KINDER MORGAN ENERGY PARTNERS
3302 DEEPWATER TERMINAL ROAD
RICHMOND, VIRGINIA
Groundwater & Environmental Services, Inc.
23 SOUTH 13TH STREET, SUITE 201, RICHMOND, VA 23219
SCALE IN FEET (APPROXIMATE)
0
50
DATE
9-22-10
FIGURE
2



DRAFTED BY: W.A.W. (N.J.)	PROCESS AND INSTRUMENTATION DIAGRAM (STORMWATER)
CHECKED BY: B.T.	KINDER MORGAN ENERGY PARTNERS 3302 DEEPWATER TERMINAL ROAD RICHMOND, VIRGINIA
REVIEWED BY: A.H.	Groundwater & Environmental Services, Inc. 23 SOUTH 13TH STREET, SUITE 201, RICHMOND, VA 23219
	NOT TO SCALE / DATE: 9-23-10 / FIGURE: 3

Attachment B

Ambient Water Quality Data

Data from James River Monitoring Station 2-JMS104.16

Kinder Morgan Transmix Co., LLC - VA0086151

Collection Date	Depth (meters)	Temp. (°C)	pH (SU)	Dissolved Oxygen (mg/L)	Salinity (g/kg)
7/22/1968	0.3	30	7.5	5	
9/8/1968	0.3	26.67	7	1	
3/20/1969	0.3	11.11	7.2	10.39	
6/19/1969	0.3	25.56	6.7	6.2	
10/2/1969	0.3	23.33	7.2	7	
4/21/1970	0.3	16.11	7.5	8	
5/8/1970	0.3	17.78	7.2	8.5	
6/18/1970	0.3	26.67	6.8	3.2	
7/2/1970	0.3	27.22	6.9	2.4	
7/22/1970	0.3	27.78	7.2	1	
8/15/1970	0.3	31.11	7.3	4.4	
8/26/1970	0.3	27.78	6.7	3	
9/9/1970	0.3	28.33	7.2	2.8	
5/6/1971	0.3	17.22	7.6	7.8	
6/13/1971	0.3	23.33	8.3	8	
7/23/1971	0.3	28.33	7.7	6.4	
8/3/1971	0.3	30.56	7.6	6	
8/31/1971	0.3	28.33	7.3	6	
9/26/1971	0.3	21.11	8	7	
10/27/1971	0.3	18.89	7	9.2	
5/2/1972	0.3	19.44	7.3	8.2	
6/17/1972	0.3	26.67	7.6	6	
7/8/1972	0.3	21.11	7.3	9.2	
7/31/1972	0.3	23.89	8	7.8	
8/9/1972	0.3	26.67	7.5	7.8	
8/20/1972	0.3		7.5	7	
9/5/1972	0.3	25	7.3	6	
10/4/1972	0.3	20	7.5	7.6	
5/3/1973	0.3	17.78	7.1	7.8	
6/6/1973	0.3	26.11	8	8	
6/9/1973	0.3	27.22	7.9	1.3	
7/15/1973	0.3	29.44	7.7	6.8	
9/29/1973	0.3	29.44	7.5	4.4	
5/26/1974	0.3	23.33	7.3	9	
6/7/1974	0.3	21.67	7.5	9	
6/27/1974	0.3	24.44	7.3	7.2	
7/2/1974	0.3	26.67	7.5	7.7	
7/26/1974	0.3	26.11	8	6.8	
8/5/1974	0.3	27.22	7.6	7.2	
8/30/1974	0.3	28	7.5	7.2	
9/26/1974	0.3	22	7.5	7.4	
10/25/1974	0.3	15	8	9.5	
5/1/1975	0.3	16.11	7.5	9.6	
6/4/1975	0.3		7.3	7.7	
6/24/1975	0.3	29.44	9	8.8	
6/30/1975	0.3	25.56	7.4	7.8	
7/28/1975	0.3	26.67	7.5	7.6	
8/13/1975	0.3	28.89	8.5	6.8	
8/16/1975	0.3	28.89	8.3	6.8	
9/3/1975	0.3	23.33	7.5	7.9	
10/1/1975	0.3	20	7.5	9.2	
2/12/1976	0.3	5.56	7.5	12.79	
3/11/1976	0.3	12.22	7.7	10	
5/4/1976	0.3	19	7.5	9.2	
6/7/1976	0.3	21.11	7.2	8.5	
5/22/1978	0.3	20.5	8.5	9	
6/15/1978	0.3	25.5	8.5	4.7	
7/11/1978	0.3	29	8.1	5.6	
8/3/1978	0.3	29.5	7.5	6	
9/25/1978	0.3	24	8.3	7.4	
12/12/1978	0.3	7	7.5	12	
4/24/1979	0.3	18	7.6	8.7	
5/19/1980	0.3	21	8.5	8.4	
7/16/1980	0.3	30	8.5	7.2	
10/20/1980	0.3	19	7.3	6	
7/27/1981	0.3	27.5	8.2	6.7	
9/8/1981	0.3	25	7.8	7.7	
5/13/1982	0.3	23	9	6.2	
6/24/1982	0.3	24	7.5	7.1	
8/9/1982	0.3	27.5	7.8	5.4	
10/28/1982	0.3	13.5	7.7	11.1	
11/18/1982	0.3	9	7.3	11.3	
5/17/1983	0.3	18.5	8	9.7	
6/28/1983	0.3	29.5	7.4	7.2	
7/28/1983	0.91	27.5	7.8	7.3	
8/16/1983	0.91				
8/30/1983	0.91	29.5	8	7.4	
9/27/1983	0.91	21	8	7.8	
10/12/1983	0.91				
6/29/1988	1	25	7.87	6.62	0
6/29/1988	3	24.5		6.3	0
6/29/1988	5	24.4		6.34	0
6/29/1988	7	24.4	7.82	6.08	0
7/18/1988	8	31	7.44	5	0
7/18/1988	1	31	7.68	6.5	0
7/18/1988	3	31		5.6	0
7/18/1988	5	31		5.4	0
7/18/1988	7	31		5.1	0
7/18/1988	8	31	7.44	5	0
8/1/1988	1	29	7.48	6.59	0
8/1/1988	3	28.2		6.38	0
8/1/1988	5	28		6.22	0
8/1/1988	7	28	7.37	6.21	0
8/15/1988	1	29.3	8.07	7.89	0
8/15/1988	3	28.8		6.51	0
8/15/1988	5	28.6		6.27	0
8/15/1988	7	28.6		6.12	0
8/15/1988	8	28.6	7.87	6.01	0
9/12/1988	1	24.5	7.6	6.7	0
9/12/1988	3	24.3		6.6	0
9/12/1988	5	24.1		6.6	0
9/12/1988	7	24		6.5	0
9/12/1988	8	23.9	7.32	6.4	0
9/27/1988	1	22.6	7.48	6.7	0
9/27/1988	3	22.4		6.7	0
9/27/1988	5	22.4		6.7	0
9/27/1988	7	23.3		6.7	0
9/27/1988	9	22.3	7.4	6.7	0
10/11/1988	1	16.15	7.81	9.14	0
10/11/1988	3	16.1		9.17	0
10/11/1988	5	16		9.13	0
10/11/1988	7	15.9		9.07	0
10/11/1988	8	15.9	7.65	9.04	0
10/26/1988	1	14	7.58	8.33	0
10/26/1988	3	14		8.28	0
10/26/1988	5	13.9		8.31	0
10/26/1988	7	13.9		8.31	0
10/26/1988	9	13.9		8.76	0
10/26/1988	11	13.9	7.44	8.4	0
10/26/1988	1	14.2	8.11	9.61	0
10/26/1988	3	14.2		9.59	0
10/26/1988	5	14.1		9.61	0
10/26/1988	7	14.1		9.6	0
10/26/1988	8	14.1	7.83	9.57	0
11/14/1988	1	11.4	7.61	10.57	0
11/14/1988	3	11.3		10.64	0
11/14/1988	5	11.3		10.67	0
11/14/1988	7	11		10.68	0
11/14/1988	8	11	7.64	10.66	0
12/20/1988	1	2.68	7.62	14.15	0
12/20/1988	3	2.65		14.21	0
12/20/1988	5	2.61		14.25	0
12/20/1988	7	2.59		14.2	0
12/20/1988	9	2.6	7.59	14.18	0
1/11/1989	1	5.83	7.54	12.57	0
1/11/1989	3	5.7		12.49	0
1/11/1989	5	5.81		12.46	0
1/11/1989	7	5.66		12.45	0
1/11/1989	8	5.66	7.58	12.52	0
2/8/1989	1	6.49	7.65	12.12	0
2/8/1989	3	6.14		12.22	0
2/8/1989	5	6.06		12.29	0
2/8/1989	7	5.96		12.38	0
2/8/1989	9	5.89	7.75	12.42	0
3/15/1989	1	8.04	7.35	11.89	0
3/15/1989	3	7.84		11.92	0
3/15/1989	5	7.83		11.89	0
3/15/1989	7	7.82		11.84	0
3/15/1989	8	7.82	7.36	11.85	0
3/28/1989	1	13.2	7.35	10.6	0
3/28/1989	3	13.04		10.61	0
3/28/1989	5	12.98		10.57	0
3/28/1989	7	12.99		10.57	0
3/28/1989	8	13		10.56	0
4/13/1989	1	11.46	7.2	10.59	0
4/13/1989	3	11.5		10.54	0
4/13/1989	5	11.48		10.49	0
4/13/1989	7	11.32		10.55	0
4/13/1989	9	11.34	7.26	10.54	0
3/13/1990	1	14.31	7.56	9.75	0
3/13/1990	3	14.2		9.75	0
3/13/1990	5	14.22		9.7	0
3/13/1990	7	14.26	7.58	9.69	0
3/28/1990	1	10.52	7.42	11.02	0
3/28/1990	3	10.51		11.02	0
3/28/1990	5	10.45		11.01	0
3/28/1990	7	10.49		10.99	0
3/28/1990	8	10.52	7.46	10.92	0
4/10/1990	1	12.23	7.17	10.58	0
4/10/1990	3	12.23		10.58	0
4/10/1990	5	12.23		10.58	0
4/10/1990	7	12.21		10.59	0
4/10/1990	8	12.21	7.2	10.46	0
4/25/1990	1	18.73	7.46	8.72	0
4/25/1990	3	18.6		8.71	0
4/25/1990	5	18.66		8.69	0
4/25/1990	7	18.6	7.57	8.66	0
5/9/1990	1	20.19	7.42	8.31	0
5/9/1990	3	20.05		8.3	0
5/9/1990	5	20.07		8.32	0
5/9/1990	7	20.07	7.55	8.31	0
5/31/1990	1	18.36	7.27	9.17	0
5/31/1990	3	18.34		9.18	0
5/31/1990	5	18.34		9.15	0
5/31/1990	7	18.33	7.33	9.12	0
6/14/1990	1	25.2	7.35	7.67	0
6/14/1990	3	24.72		7.63	0
6/14/1990	5	24.49		7.63	0
6/14/1990	7	24.49		7.63	0
6/14/1990	8	24.5	7.38	7.56	0
6/27/1990	1	28.62	7.51	7.54	0
6/27/1990	3	27.93		7.01	0
6/27/1990	5	27.64		6.97	0
6/27/1990	7	27.61	7.39	7	0
7/10/1990	1	30.17	7.77	8.18	0
7/10/1990	3	29.58		8.14	0
7/10/1990	5	29.08		6.7	0
7/10/1990	7	29.01		6.24	0
7/24/1990	1	30.9	7.54	7.43	0
7/24/1990	3	30.49		6.83	0
7/24/1990	5	30.41		6.86	0
7/24/1990	7	30.16		7	0
7/24/1990	8	30.14	7.36	7.12	0
8/7/1990	1	27.56	7	6.75	0
8/7/1990	3	27.17		6.82	0
8/7/1990	5	27.05		6.81	0
8/7/1990	7	27	7	7.03	0
8/23/1990	1	25.98	7.15	7.17	0
8/23/1990	3	25.66		7.2	0
8/23/1990	5	28.57		7.26	0
8/23/1990	7	25.47		7.36	0
8/23/1990	9	25.48	7.16	7.65	0
9/6/1990	1	27.94	7.5	8.54	0
9/6/1990	3	27.15		7.66	0
9/6/1990	5	26.89		7.38	0
9/6/1990	7	26.79		7.24	0
9/6/1990	8	26.8	7.39	7.24	0
9/24/1990	1	22.03	7.62	9.18	0
9/24/1990	3	21.53		8.01	0
9/24/1990	5	21.43		7.92	0
9/24/1990	7	21.43	7.49	8.16	0
10/9/1990	1	23.61	7.24	8.31	0
10/9/1990	3	22.97		7.88	0
10/9/1990	5	22.83		7.67	0
10/9/1990	7	22.82		7.53	0
10/9/1990	8	22.73	7.23	7.46	0
10/25/1990	1	15.92	7.31	9.31	0
10/25/1990	3	15.92		9.3	0
10/25/1990	5	15.92		9.28	0
10/25/1990	7	15.93		9.27	0
10/25/1990	9	15.94	7.38	9.27	0
11/7/1990	1	14.72	7.2	9.76	0
11/7/1990	3	14.66		9.79	0
11/7/1990	5	14.51		9.86	0
11/7/1990	7	14.38	7.17	9.88	0
12/12/1990	1	6.41	7.08	12.83	0
12/12/1990	3	6.41		12.89	0
12/12/1990	5	6.43		12.98	0
12/12/1990	7	6.46	7.04	13.02	0
1/14/1991	1	6.43	7.04	12.06	0
1/14/1991	3	6.43		12.22	0
1/14/1991	9	6.43	7.03	12.11	0
2/25/1991	1	6.98	7.27	12.32	0
2/25/1991	3	6.98		12.39	0
2/25/1991	5	6.95		12.4	0
2/25/1991	7	6.96	7.29	12.5	0
3/6/1991	1	10.04	7.16	11.18	0
3/6/1991	3	10.04		11.14	0
3/6/1991	5	10.04		11.14	0
3/6/1991	7	10.05		11.19	0
3/6/1991	8	10.04	7.18	11.18	0
3/20/1991	1	10.62	6.99	11	0
3/20/1991	3	10.61		10.99	0
3/20/1991	5	10.63		10.99	0
3/20/1991	7	10.63	7.01	10.99	0
4/3/1991	1	12.09	6.9	11.2	0
4/3/1991	3	12.07		11.21	0
4/3/1991	5	12.09		11.25	0
4/3/1991	7	12.09	6.87	11.37	0
4/23/1991	1	14.12	7.06	10.53	0
4/23/1991	3	13.96		10.51	0
4/23/1991	5	13.97		10.56	0
4/23/1991	7	13.97	7.07	10.73	0
5/2/1991	1	20.52	7.06	8.45	0
5/2/1991	3	20.44		8.51	0
5/2/1991	5	20.42		8.51	0
5/2/1991	7	20.41		8.42	0
5/2/1991	8	20.41	7.08	8.52	0
5/16/1991	1	26.73	7.44	6.98	0
5/16/1991	3	26.93		7.03	0
5/16/1991	5	26.38		7.03	0
5/16/1991	6	26.14	7.38	7.15	0
6/13/1991	1	26.96	7.32	7.22	0
6/13/1991	3	26.92		7.12	0
6/13/1991	5	26.8		7.05	0
6/13/1991	7	26.79		7.05	0
6/13/1991	8	26.77	7.36	7.06	0
6/27/1991	1	26.37	7.18	7.2	0
6/27/1991	3	26.2		7.09	0
6/27/1991	5	26.2		7.16	0
6/27/1991	7	26.18	7.19	7.2	0
7/16/1991	1	29.16	7.15	6.31	0
7/16/1991	3	29.07		6.33	0
7/16/1991	5	28.88		6.29	0
7/16/1991	7	28.88	7.17	6.45	0
7/30/1991	1	24.27	6.85	7.47	0
7/30/1991	3	24.26		7.51	0
7/30/1991	5	24.26		7.54	0
7/30/1991	6	24.25	6.67	7.72	0
8/13/1991	1	26.75		7.64	0
8/13/1991	3	26.49		7.71	0
8/13/1991	5	26.39		7.79	0
8/13/1991	7	26.39		7.81	0
8/27/1991	1	27.32	7.31	6.85	0
8/27/1991	3	26.98		6.87	0
8/27/1991	5	26.79		6.88	0
8/27/1991	7	26.55		6.86	0

Continued on next page . . .

Data from James River Monitoring Station 2-JMS104.16
Kinder Morgan Transmix Co., LLC - VA0086151

Collection Date	Depth (meters)	Temp. (°C)	pH (SU)	Dissolved Oxygen (mg/L)	Salinity (g/kg)
8/27/1991	8	26.45	7.27	7.06	0
9/12/1991	1	27.08		8.95	0
9/12/1991	3	26.89		8.95	0
9/12/1991	5	26.64		8.55	0
9/12/1991	7	26.57		8.55	0
9/12/1991	8	26.53		8.68	0
10/1/1991	1	21.52	7.38	7.88	0
10/1/1991	3	21.68		7.94	0
10/1/1991	5	21.56		7.9	0
10/1/1991	7	21.54	7.39	7.9	0
10/10/1991	1	19.55	7.55	8.74	0
10/10/1991	3	19.4		8.75	0
10/10/1991	5	19.32		9.11	0
10/10/1991	7	19.18		9.1	0
10/28/1991	1	18.81	7.1	8.55	0
10/28/1991	3	18.79		8.65	0
10/28/1991	5	18.71		8.76	0
10/28/1991	7	18.64	7.12	8.88	0
11/18/1991	1	10.92	7.29	10.36	0
11/18/1991	3	10.92		10.53	0
11/18/1991	5	10.93		10.87	0
11/18/1991	7	10.9		11.04	0
11/18/1991	8	10.81	7.31	11.26	0
12/11/1991	1	9.71	7.23	10.97	0
12/11/1991	3	9.71		10.97	0
12/11/1991	5	9.71		10.93	0
12/11/1991	7	9.71		11.37	0
12/11/1991	9	9.68	7.38	11.37	0
1/9/1992	1	7.13	7.04	12.98	0
1/9/1992	3	7.13		13.6	0
1/9/1992	5	7.14		13.55	0
1/9/1992	7	7.13	7.09	13.49	0
2/10/1992	1	5.05	8.26	13.64	0
2/10/1992	3	5.05		13.76	0
2/10/1992	5	5.02		13.73	0
2/10/1992	7	5.03	8.24	13.67	0
3/24/1992	1	8.81	7.24	11.9	0
3/24/1992	3	8.77		12.4	0
3/24/1992	5	8.77		12.5	0
3/24/1992	6	8.78	7.23	12.51	0
4/7/1992	1	11.15	7	10.87	0
4/7/1992	3	11.15		10.87	0
4/7/1992	5	11.16		10.95	0
4/7/1992	7	11.19	6.94	11.02	0
4/21/1992	1	20.03	7.92	8.43	0
4/21/1992	3	19.98		8.45	0
4/21/1992	5	19.94		8.44	0
4/21/1992	7	19.93	7.8	8.45	0
5/6/1992	1	17.87	7.42	8.96	0
5/6/1992	3	17.83		8.94	0
5/6/1992	5	17.74		8.95	0
5/6/1992	6	17.73	7.2	8.96	0
5/27/1992	1	19.05	7.39	8.66	0
5/27/1992	3	18.86		8.7	0
5/27/1992	5	18.76		8.7	0
5/27/1992	7	18.71		8.69	0
5/27/1992	8	18.71	7.29	8.72	0
6/18/1992	1	22.96	7.44	8.06	0
6/18/1992	3	22.93		8.08	0
6/18/1992	5	22.82		8.08	0
6/18/1992	7	22.7	7.34	8.08	0
7/6/1992	1	27.17	7.46	7.36	0
7/6/1992	3	26.84		7.22	0
7/6/1992	5	26.8		7.3	0
7/6/1992	6	26.8	7.46	7.32	0
7/20/1992	1	30.6	7.75	7.9	0
7/20/1992	3	29.9		7.35	0
7/20/1992	5	29.82		7.59	0
7/20/1992	7	29.51	7.17	7.21	0
9/1/1992	1	26.72	7.55	7.97	0
9/1/1992	3	26.13		7.46	0
9/1/1992	5	26.07		7.39	0
9/1/1992	7	26.02	7.3	7.48	0
10/8/1992	1	17.36	7.62	9.13	0
10/8/1992	3	17.24		9.19	0
10/8/1992	5	17		9.3	0
10/8/1992	7	16.85		9.6	0
10/8/1992	9	16.81	7.49	9.91	0
11/2/1992	1	14.37	7.13	9.8	0
11/2/1992	3	14.24		9.83	0
11/2/1992	5	14.17		9.82	0
11/2/1992	7	14.19	7.11	9.94	0
11/17/1992	1	8.04	7.68	11.9	0
11/17/1992	3	7.97		11.93	0
11/17/1992	5	7.98		11.92	0
11/17/1992	7	7.97	7.74	11.9	0
12/15/1992	1	5.09	7.27	12.93	0
12/15/1992	3	5.11		12.93	0
12/15/1992	5	5.1		12.93	0
12/15/1992	7	5.1		13	0
12/15/1992	8	5.1	7.18	13.06	0
1/14/1993	1	6.66	7.42	12.35	0
1/14/1993	3	6.66		12.42	0
1/14/1993	5	6.65		12.42	0
1/14/1993	7	6.65	7.2	12.49	0
2/9/1993	1	5.45	7.52	13.32	0
2/9/1993	3	5.3		13.34	0
2/9/1993	5	5.21		13.38	0
2/9/1993	7	5.13		13.36	0
2/9/1993	8	5.13	7.38	13.43	0
3/10/1993	1	7.76	7.3	11.99	0
3/10/1993	3	7.76		12	0
3/10/1993	5	7.76		12	0
3/10/1993	7	7.76	7.18	12.2	0
4/8/1993	1	10.83	7.3	11.14	0
4/8/1993	3	10.83		11.12	0
4/8/1993	5	10.81		11.13	0
4/8/1993	7	10.79		11.12	0
4/8/1993	9	10.81	7.3	11	0
4/28/1993	1	16.3	7.39	9.86	0
4/28/1993	3	16.2		9.89	0
4/28/1993	5	16.2		9.89	0
4/28/1993	7	16.2	7.34	9.97	0
5/6/1993	1	20.56	7.41	9.01	0
5/6/1993	3	20.5		8.99	0
5/6/1993	5	20.47		8.87	0
5/6/1993	7	20.47		8.87	0
5/6/1993	9	20.48	7.28	8.87	0
6/2/1993	1	23.92	7.55	7.93	0
6/2/1993	3	23.57		7.9	0
6/2/1993	5	23.32		7.94	0
6/2/1993	7	23.17		7.94	0
6/2/1993	8	23.13	7.35	7.9	0
6/7/1993	1	22.94	7.16	8.32	0
6/7/1993	3	22.86		8.38	0
6/7/1993	5	22.83		8.37	0
6/7/1993	7	22.82	7.06	8.44	0
6/22/1993	1	29.33	7.85	7.17	0
6/22/1993	3	29.14		7.29	0
6/22/1993	5	29.01		7.51	0
6/22/1993	6	28.84	7.42	7.55	0
7/7/1993	1	31.39	7.63	6.62	0
7/7/1993	3	30.96		6.52	0
7/7/1993	5	30.88		6.41	0
7/7/1993	7	30.62	7.45	6.62	0
7/21/1993	1	30.72	7.52	6.92	0
7/21/1993	3	29.92		6.7	0
7/21/1993	5	29.62		6.52	0
7/21/1993	7	29.45	7.27	6.36	0
8/4/1993	1	29.57	7.84	7.75	0
8/4/1993	3	29.2		7.33	0
8/4/1993	5	29.16		7.3	0
8/4/1993	7	29.11	7.58	7.3	0
8/18/1993	1	29.52	7.51	7.17	
8/18/1993	3	29.11		6.99	
8/18/1993	5	29		6.98	
8/18/1993	7	28.9	7.38	6.98	
9/2/1993	1	30.35	7.6	7	0
9/2/1993	3	29.96		6.7	0
9/2/1993	5	29.7		6.46	0
9/2/1993	6	29.69	7.44	6.55	0
9/20/1993	1	24.58	7.58	7.44	0
9/20/1993	3	24.27		7.15	0
9/20/1993	5	24.24		7.13	0
9/20/1993	7	24.25		7.16	0
9/20/1993	8	24.25	7.5	7.18	0
10/5/1993	1	19.78	8.49	8.9	0
10/5/1993	3	19.69		8.83	0
10/5/1993	5	19.61		8.83	0
10/5/1993	6	19.53	8.39	8.79	0
12/2/1993	1	7.94	7.17	11.95	0
12/2/1993	3	7.79		11.95	0
12/2/1993	5	7.78		12.01	0
12/2/1993	7	7.79		12.06	0
12/2/1993	8	7.79	7.2	12.08	0
2/17/1994	1	4.72	7.42	13.09	0
2/17/1994	3	4.74		13.15	0
2/17/1994	5	4.71		13.21	0
2/17/1994	7	4.72		13.28	0
2/17/1994	8	4.71	7.42	13.35	0
3/21/1994	1	9.73	7.6	11.16	0
3/21/1994	3	9.72		11.13	0
3/21/1994	5	9.73		11.13	0
3/21/1994	7	9.73	7.61	11.19	0
4/14/1994	1	16.72	7.82	9.89	0
4/14/1994	3	16.55		9.9	0
4/14/1994	5	9.9		9.9	0
4/14/1994	7	16.43		9.88	0
4/14/1994	8	16.38	7.7	9.91	0
5/23/1994	1	21.1	9.09	9.84	0
5/23/1994	3	20.51		8.67	0
5/23/1994	5	20.27		7.9	0
5/23/1994	7	20.17		7.84	0
5/23/1994	9	20.03	8.59	7.59	0
6/9/1994	1	26.75	8	8.55	0
6/9/1994	3	26.3		7.57	0
6/9/1994	5	25.98		6.69	0
6/9/1994	7	25.81		6.74	0
6/9/1994	9	25.68	7.45	6.73	0
7/7/1994	1	31.87	7.59	7.75	0
7/7/1994	3	30.6		6.91	0
7/7/1994	5	30.16		6.4	0
7/7/1994	7	30.04		6.26	0
7/7/1994	9	29.96	7.25	6.05	0
8/11/1994	1	28.4	8.16	8.7	0
8/11/1994	3	27.56		8.18	0
8/11/1994	5	27.35		8.2	0
8/11/1994	7	27.22		8.11	0
8/11/1994	8	26.99	7.67	7.8	0
9/8/1994	9	24.03	7.86	7.6	0
9/8/1994	1	25.48	8.12	8.03	0
9/8/1994	3	24.4		7.73	0
9/8/1994	5	24.19		7.76	0
9/8/1994	7	24.03		7.65	0
10/17/1994	9	15.79	8	9.27	
10/17/1994	1	16.98	8.42	10.81	
10/17/1994	3	16.52		9.76	
10/17/1994	5	16.01		9.43	
10/17/1994	7	15.96		9.38	
11/30/1994	8	8.66	7.7	11.76	0
11/30/1994	1	9.05	7.67	11.71	0
11/30/1994	3	8.89		11.7	0
11/30/1994	5	8.91		11.71	0
11/30/1994	7	8.69		11.75	0
12/6/1994	8	9.79	7.55	10.92	0
12/6/1994	1	9.97	7.56	10.94	0
12/6/1994	3	9.96		10.96	0
12/6/1994	5	9.89		10.92	0
12/6/1994	7	9.81		10.91	0
1/25/1995	9	5.14	7.6	12.98	0
1/25/1995	1	5.15	7.65	12.95	0
1/25/1995	3	5.16		12.96	0
1/25/1995	5	5.15		12.97	0
1/25/1995	7	5.14		12.96	0
2/27/1995	1	8.19	7.72	11.78	0
2/27/1995	3	7.94		11.74	0
2/27/1995	5	7.96		11.72	0
2/27/1995	7	7.99		11.72	0
2/27/1995	9	8.02	7.67	11.72	0
3/23/1995	1	13.75	7.64	10.28	0
3/23/1995	3	13.7		10.27	0
3/23/1995	5	13.62		10.28	0
3/23/1995	7	13.67		10.28	0
3/23/1995	8	13.65	7.62	10.28	0
4/18/1995	1	16.6	7.71	9.15	0
4/18/1995	3	16.3		9.11	0
4/18/1995	5	16.25		9.11	0
4/18/1995	7	16.23	7.68	9.06	0
5/23/1995	1	23.88	7.33	8.02	0
5/23/1995	8	22.91	7.26	8.17	0
6/20/1995	1	25.77	7.4	7.72	0
6/20/1995	3	24.98		7.71	0
6/20/1995	5	24.87		7.73	0
6/20/1995	6	24.85	7.26	7.81	0
7/18/1995	1	31.04	7.66	7.06	0
7/18/1995	3	30.82		7.03	0
7/18/1995	5	30.7		6.87	0
7/18/1995	7	30.71		6.78	0
7/18/1995	8	30.7	7.49	6.78	0
8/23/1995	1	29.75	8.33	8.7	0
8/23/1995	3	29.1		7.84	0
8/23/1995	5	28.68		7.09	0
8/23/1995	7	28.65		6.86	0
8/23/1995	9	28.65	7.74	6.8	0
9/21/1995	1	23.3	8.22	8.79	0
9/21/1995	3	22.83		8.06	0
9/21/1995	5	22.69		7.95	0
9/21/1995	7	22.51		7.88	0
9/21/1995	9	22.48	7.8	7.9	0
10/19/1995	1	17.3	7.31	9.07	0
10/19/1995	3	16.85		9.27	0
10/19/1995	5	16.58		9.27	0
10/19/1995	7	16.36		9.31	0
10/19/1995	9	16.38	7.34	9.27	0
11/20/1995	8	6.4	7.35	12.26	0
11/20/1995	1	6.4	7.4	12.38	0
11/20/1995	3	6.37		12.34	0
11/20/1995	5	6.42		12.27	0
11/20/1995	7	6.43		12.27	0
12/14/1995	1	2.8	7.37	13.64	0
12/14/1995	3	2.77		13.6	0
12/14/1995	5	2.77		13.58	0
12/14/1995	7	2.75		13.56	0
12/14/1995	8	2.75	7.37	13.56	0
1/29/1996	1	4.36	7.34	13.28	0
1/29/1996	3	4.36		13.26	0
1/29/1996	5	4.36		13.28	0
1/29/1996	7	4.36		13.3	0
1/29/1996	9	4.35		13.3	0
1/29/1996	11	4.35	7.26	13.46	0
2/20/1996	1	4	7.44	13.3	0
2/20/1996	3	4		13.3	0
2/20/1996	5	4		13.3	0
2/20/1996	7	4		13.31	0
2/20/1996	9	4	7.44	13.29	0
3/25/1996	1	9.31	7.36	11.8	0
3/25/1996	3	9.27		11.76	0
3/25/1996	5	9.27		11.77	0
3/25/1996	7	9.26	7.34	11.79	0
4/29/1996	8	19.29	8.19	8.37	0
4/29/1996	1	19.6	8.44	8.63	0
4/29/1996	3	19.46		8.52	0
4/29/1996	5	19.4		8.42	0
4/29/1996	7	19.27		8.3	0
5/15/1996	9	18.47	7.57	9.42	0
5/15/1996	1	18.54	7.78	9.66	0
5/15/1996	3	18.54		9.58	0
5/15/1996	5	18.52		9.49	0
5/15/1996	7	18.48		9.44	0
6/18/1996	1	26.9	7.46	7.86	0
6/18/1996	3	26.54		7.73	0
6/18/1996	5	26.36		7.73	0
6/18/1996	7	26.36		7.73	0

Continued on next page . . .

Data from James River Monitoring Station 2-JMS104.16

Kinder Morgan Transmix Co., LLC - VA0086151

Collection Date	Depth (meters)	Temp. (°C)	pH (SU)	Dissolved Oxygen (mg/L)	Salinity (g/kg)
6/18/1996	8	26.35	7.38	7.73	0
7/23/1996	8	27.28	7.36	6.88	0
7/23/1996	1	27.76	7.6	7.32	0
7/23/1996	3	27.51		7.26	0
7/23/1996	5	27.35		7.11	0
7/23/1996	7	27.29		7	0
8/20/1996	1	28.12	7.68	7.35	0
8/20/1996	3	27.7		7.31	0
8/20/1996	5	27.66		7.31	0
8/20/1996	7	27.52	7.53	7.27	0
9/24/1996	8	20.13	7.72	8.79	0
9/24/1996	1	20.66	7.78	8.75	0
9/24/1996	3	20.45		8.78	0
9/24/1996	5	20.15		8.79	0
9/24/1996	7	20.13		8.77	0
10/22/1996	9	14.63	7.3	9.78	0
10/22/1996	1	15	7.32	9.75	
10/22/1996	3	14.88		9.75	0
10/22/1996	5	14.64		9.77	0
10/22/1996	7	14.64		9.78	0
11/19/1996	1	6.45	7.47	12.12	0
11/19/1996	3	6.45		12.13	0
11/19/1996	5	6.45		12.13	0
11/19/1996	7	6.45		12.17	0
11/19/1996	8	6.43	7.4	12.24	0
12/10/1996	1	5.21	7.19	12.87	0
12/10/1996	3	5.19		12.85	0
12/10/1996	5	5.19		12.82	0
12/10/1996	7	5.19		12.73	
12/10/1996	9	5.19	7.18	12.7	0
2/18/1997	3	6.14		13.66	0
2/18/1997	5	6.12		13.66	0
2/18/1997	7	6.1		13.72	0
2/18/1997	8	6.1	7.23	13.81	0
2/18/1997	1	6.14	7.28	13.65	0
3/18/1997	1	9.72	7.7	11.48	0
3/18/1997	3	9.74		11.37	0
3/18/1997	5	9.72		11.4	0
3/18/1997	7	9.73		11.42	0
4/22/1997	1	14.08	7.64	9.83	0
4/22/1997	3	14.04		9.8	0
4/22/1997	5	14.01		9.8	0
4/22/1997	7	13.99		9.82	0
4/22/1997	9	14.01	7.52	9.84	0
5/28/1997	1	21.99	7.67	7.92	0
5/28/1997	3	21.5		7.86	0
5/28/1997	5	20.79		7.76	0
5/28/1997	7	20.74		7.78	0
5/28/1997	8	20.72	7.44	7.8	0
6/24/1997	7	29.21	7.92	6.81	0
6/24/1997	1	30.2	8.55	7.4	0
6/24/1997	3	29.75		7.16	0
6/24/1997	5	29.39		7.05	0
7/15/1997	1	30.85	8.61		
7/15/1997	8	29.24	7.66		
8/19/1997	9	30.55	7.57	6.24	0
8/19/1997	1	30.71	7.71	6.55	0
9/23/1997	1	24.19	8.31	8.07	0
9/23/1997	6	23.55	8.27	8.07	0
10/21/1997	1	15.48	7.85	10.02	0
10/21/1997	7	14.65	7.74	9.86	0
11/18/1997	6	7.68	7.52	12.03	
11/18/1997	1	7.94	7.56	11.95	
12/10/1997	1	5.67	7.63	12.31	
12/10/1997	3	5.67		12.3	0
12/10/1997	5	5.65		12.28	
12/10/1997	8	5.67	7.58	12.28	
1/21/1998	1	5.51	7.85	10.78	
1/21/1998	3	5.51		10.83	
1/21/1998	5	5.51		10.84	
1/21/1998	7	5.5		10.95	
1/21/1998	8	5.5	7.83	10.98	
3/17/1998	9	7.09	7.65	13.03	
3/17/1998	1	7.08	7.64	13	
3/17/1998	3	7.08		12.99	
3/17/1998	5	7.08		12.99	
3/17/1998	7	7.08		12.99	
4/21/1998	1	14.8	7.49	10.9	
4/21/1998	3	14.78		10.9	
4/21/1998	5	14.77		10.9	
4/21/1998	7	14.78		10.9	
4/21/1998	9	14.78	7.48	10.9	
5/19/1998	7	23.02	7.82	8.61	
5/19/1998	1	23.18	7.91	8.78	
5/19/1998	3	23.08		8.68	
5/19/1998	5	23.04		8.62	
6/23/1998	1	28.14	8.05	7.83	
6/23/1998	3	27.94		7.5	
6/23/1998	5	27.77		7.29	
6/23/1998	7	27.73		7.14	
6/23/1998	9	27.72	7.79	7.11	
7/21/1998	1	31.4	8.26	7.89	
7/21/1998	3	30.55		7.32	
7/21/1998	5	30.04		6.91	
7/21/1998	7	29.9	8.07	6.84	
8/18/1998	8	27.89	7.71	7.21	0
8/18/1998	1	28.81	7.89	7.5	0
8/18/1998	3	28.13		7.45	
8/18/1998	5	27.98		7.35	
8/18/1998	7	27.9		7.21	
9/22/1998	1	27.7	7.86	6.92	0
9/22/1998	3	27.5		6.88	
9/22/1998	5	27.31		6.63	
9/22/1998	7	27.15		6.72	
9/22/1998	9	27.12	7.85	6.75	0
10/20/1998	8	19.15	7.87	8.67	
10/20/1998	1	19.46	7.87	8.64	
10/20/1998	3	19.3		8.68	
10/20/1998	5	19.24		8.66	
10/20/1998	7	19.2		8.63	
11/18/1998	9	12.54	7.6	10.64	0.2
11/18/1998	1	12.62	7.72	10.73	0.2
11/18/1998	3	12.57		10.72	0.2
11/18/1998	5	12.54		10.68	0.2
11/18/1998	7	12.54		10.64	0.2
12/15/1998	9	8.77	7.23	12.49	
12/15/1998	1	8.77	7.28	12.33	
12/15/1998	3	8.77		12.37	
12/15/1998	5	8.77		12.37	
12/15/1998	7	8.77		12.42	
1/19/1999	1	5.4	7.35	12.59	
1/19/1999	3	5.39		12.62	
1/19/1999	5	5.4		12.63	
1/19/1999	7	5.4		12.61	
1/19/1999	9	5.38	7.35	12.58	
2/23/1999	1	5.61	7.29	12.51	
2/23/1999	3	5.54		12.51	
2/23/1999	5	5.49		12.52	
2/23/1999	7	5.48	7.21	12.4	
3/23/1999	1	9.73	7.18	11.08	
3/23/1999	3	9.72		11.16	
3/23/1999	5	9.71		11.3	
3/23/1999	7	9.71	7.11	11.1	
4/20/1999	8	16.49	8.05	8.76	0.1
4/20/1999	1	16.75	8.37	8.88	0.1
4/20/1999	3	16.59		8.79	0.1
4/20/1999	5	16.54		8.78	0.1
4/20/1999	7	16.53		8.79	0.1
5/20/1999	7	20.6	7.46	8.35	
5/20/1999	1	21.19	7.48	8.39	
5/20/1999	3	20.62		8.36	
5/20/1999	5	20.6		8.35	
6/22/1999	8	22.35	7.3	8.03	0
6/22/1999	1	22.85	7.37	7.82	
6/22/1999	3	22.62		7.72	
6/22/1999	5	22.57		7.6	
6/22/1999	7	22.35		7.86	
7/20/1999	1	30.3	7.87	8.38	
7/20/1999	3	29.55		6.97	
7/20/1999	5	29.41		6.78	
7/20/1999	6	29.36	7.45	6.71	
8/17/1999	1	30.22	8.43	11.3	0.2
8/17/1999	3	29.3		8.32	0.2
8/17/1999	5	29.14		7.84	0.2
8/17/1999	7	29	7.62	7.41	0.2
9/21/1999	1	21.57	7.23	8.92	0
9/21/1999	3	21.5		9.01	0
9/21/1999	5	21.5		9.01	0
9/21/1999	7	21.07		8.8	0
9/21/1999	8	20.88	7.13	8.9	0
10/28/1999	7	13.17	7.56	9.41	0.1
10/28/1999	1	13.64	7.6	9.68	0.1
10/28/1999	3	13.41		9.63	0.1
10/28/1999	5	13.23		9.65	0.1
11/18/1999	1	9.8	7.71	10.27	0
11/18/1999	3	9.97		10.59	0
11/18/1999	5	9.87		10.61	0
11/18/1999	7	9.85	7.64	10.58	0
12/21/1999	7	7.16		11.64	0
12/21/1999	9	7.13	7.43	11.65	0
12/21/1999	1	7.16	7.45	11.76	0
12/21/1999	3	7.16		11.67	0
12/21/1999	5	7.16		11.81	0
1/18/2000	9	3.39	7.47	13.6	0
1/18/2000	1	3.35	7.5	13.03	0
1/18/2000	3	3.35		13.19	0
1/18/2000	5	3.35		13.28	0
1/18/2000	7	3.39		13.39	0
2/23/2000	9	7.25	7.38	11.85	0
2/23/2000	1	7.33	7.43	11.78	0
2/23/2000	3	7.34		11.83	0
2/23/2000	5	7.29		11.82	0
2/23/2000	7	7.3		11.85	0
3/28/2000	8	13.98	7.4	9.92	0
3/28/2000	1	14.05	7.47	9.87	0
3/28/2000	3	13.98		9.84	0
3/28/2000	5	13.97		9.85	0
3/28/2000	7	13.97		9.87	0
4/24/2000	8	16.57	7.24	9.54	0
4/24/2000	1	16.67	7.3	9.35	0
4/24/2000	3	16.6		9.4	0
4/24/2000	5	16.59		9.4	0
4/24/2000	7	16.58		9.45	0
5/23/2000	9	22.2	7.42	7.1	0
5/23/2000	1	22.33	7.43	6.99	0
5/23/2000	3	22.29		7.11	0
5/23/2000	5	22.22		6.6	0
5/23/2000	7	22.19		7.05	0
6/20/2000	8	28.2	7.55	6.57	0.1
6/20/2000	1	28.74	7.67	7.07	0
6/20/2000	3	28.39		6.52	0
6/20/2000	5	28.22		6.67	0.1
6/20/2000	7	28.19		6.49	0.1
7/18/2000	9	27.96	7.29	6.47	0
7/18/2000	1	29.08	7.64	7.89	0
7/18/2000	3	28.48		6.94	0
7/18/2000	5	28.06		6.67	0
7/18/2000	7	28.04		6.63	0
8/22/2000	8	25.82	7.82	7.29	0
8/22/2000	1	26.38	8.04	7.5	0
8/22/2000	3	26.38		7.3	0
8/22/2000	5	25.86		7.21	0
8/22/2000	7	25.83		7.19	0
9/26/2000	10	20.47	7.56	8.07	0.1
9/26/2000	1	20.52	7.57	7.85	0.1
9/26/2000	3	20.52		7.99	0.1
9/26/2000	5	20.52		8.02	0.1
9/26/2000	7	20.47		8	0.1
9/26/2000	9	20.47		8	0.1
10/24/2000	8	18.43	7.66	7.87	0
10/24/2000	1	19.03	7.67	8.08	0
10/24/2000	3	18.56		7.98	0
10/24/2000	5	18.5		7.92	0
10/24/2000	7	18.45		7.69	0
1/23/2001	1	2.68	7.05	13.77	0
1/23/2001	3	2.66		13.76	0
1/23/2001	5	2.64	7.05	13.73	0
2/20/2001	1	8.9	7.75	11.58	0.1
2/20/2001	3	8.54		11.56	0.1
2/20/2001	5	8.26		11.67	0.1
2/20/2001	7	8.21	7.69	11.63	0.1
3/27/2001	1	9.46	7.08	12.32	0.1
3/27/2001	3	9.39		12.33	0.1
3/27/2001	5	9.34		12.45	0.1
3/27/2001	7	9.34		12.47	0.1
3/27/2001	8	9.31	7.08	12.73	0.1
4/24/2001	1	21.47	8.6	9.04	0
4/24/2001	3	21.04		8.57	0
4/24/2001	5	20.65		7.89	0
4/24/2001	7	20.69	6.77	6.5	0
6/19/2001	1	28.56	8.53	8.4	0.1
6/19/2001	3	27.98		8.08	0.1
6/19/2001	5	27.28		7.84	0.1
6/19/2001	7	27.11		7.65	0.1
6/19/2001	8	27.07	7.49	7.55	0.1
7/24/2001	1	28.2	7.79	7.78	0
7/24/2001	3	27.62	7.57	7.09	0
7/24/2001	5	27.53	7.44	7.06	0
7/24/2001	6	27.47	7.37	6.8	0
8/21/2001	1	28.78	7.7	6.46	0
8/21/2001	3	28.69		6.38	0
8/21/2001	5	28.64		6.66	0
8/21/2001	7	28.67		6.47	0
8/21/2001	8	28.61	7.64	6.81	0
9/18/2001	1	24.35	8.32	8.18	0.2
9/18/2001	3	23.46		6.89	0.2
9/18/2001	5	23.24		6.94	0.2
9/18/2001	7	22.96		7.09	0.2
9/18/2001	8	22.8	7.95	7.22	0.2
10/16/2001	1	19.51	7.92	9.12	0.3
10/16/2001	3	19.38		8.86	0.3
10/16/2001	5	19.37		8.88	0.3
10/16/2001	7	19.35		8.75	0.3
10/16/2001	8	19.33	7.82	8.82	0.3
11/27/2001	1	12.42	7.79	10.22	0
11/27/2001	3	11.77		10.41	0
11/27/2001	5	11.68		10.56	0
11/27/2001	7	11.67		10.63	0
11/27/2001	8	11.69	7.75	10.84	0
12/12/2001	1	11.83	7.6	10.09	0
12/12/2001	3	11.79		10.16	0
12/12/2001	5	11.72		10.2	0
12/12/2001	7	11.72		10.32	0
12/12/2001	9	11.34	7.54	10.55	0.1
1/22/2002	1	5.69	7.61	12.63	0
1/22/2002	3	5.65		12.78	0
1/22/2002	5	5.63		12.94	0
1/22/2002	7	5.6	7.45	13.29	0
2/19/2002	1	8.13	7.78	11.51	0.09
2/19/2002	3	7.75		11.22	0.09
2/19/2002	5	7.23		11.36	0.09
2/19/2002	7	7.23	7.66	12.21	0.09
3/19/2002	1	12.8	7.75	9.05	0.13
3/19/2002	3	12.8		9.11	0.13
3/19/2002	5	12.74		8.97	0.13
3/19/2002	7	12.76		9.14	0.13
3/19/2002	8	12.69	7.67	9.26	0.13
4/16/2002	1	23.5	7.58	7.66	0.7
4/16/2002	3	22.69		7.72	0.7
4/16/2002	5	22.3		7.73	0.7
4/16/2002	7	21.87	7.45	7.77	0.7
5/30/2002	1	27.12	7.63	6.67	0
5/30/2002	3	26.51	7.55	6.43	0
5/30/2002	5	26.36	7.53	6.47	0
5/30/2002	7	26.2	7.53	6.33	0
5/30/2002	8	26.18	7.54	6.21	0
6/25/2002	1	28.64	7.63		0
6/25/2002	3	28.57	7.64		0
6/25/2002	5	28.49	7.52		0
6/25/2002	7	28.46	7.53		0
6/25/2002	8	28.4	7.48		0
7/23/2002	1	30.3	7.57	6.25	0
7/23/2002	3	30.06	7.49	5.85	0

Continued on next page . . .

Data from James River Monitoring Station 2-JMS104.16

Kinder Morgan Transmix Co., LLC - VA0086151

Collection Date	Depth (meters)	Temp. (°C)	pH (SU)	Dissolved Oxygen (mg/L)	Salinity (g/kg)
7/23/2002	5	29.98	7.48	5.77	0
7/23/2002	7	29.95	5.74	7.48	0
7/23/2002	8	29.96	7.48	5.75	0
8/13/2002	1	29.05	8.29	9.39	0
8/13/2002	3	28.18	7.95	8.18	0
8/13/2002	5	28.18	7.78	7.53	0
8/13/2002	7	28.03	7.72	7.34	0
9/24/2002	1	26.16	7.75	8.39	0
9/24/2002	3	26.08	7.41	7.52	0
9/24/2002	5	25.85	7.41	7.07	0
9/24/2002	7	25.76	7.38	6.9	0
9/24/2002	8	25.71	7.36	6.89	0
10/22/2002	1	16.56	7.93	8.32	0
10/22/2002	3	16.48	7.92	8.12	0
10/22/2002	5	16.38	7.91	8.17	0
10/22/2002	7	16.37	7.92	8.2	0
10/22/2002	9	16.27	7.92	8.45	0
11/19/2002	1	10.23	7.13	12.19	0
11/19/2002	3	10.23	7.12	11.93	0
11/19/2002	5	10.23	7.13	11.95	0
11/19/2002	7	10.22	7.12	12.08	0
11/19/2002	8	10.23	7.13	12.32	0
12/10/2002	1	2.45	7.6	14.31	0
12/10/2002	3	2.46	7.59	14.59	0
12/10/2002	5	2.45	7.58	14.53	0
12/10/2002	7	2.46	7.57	15.66	0
1/21/2003	1	2.2	7.65	14.47	0
1/21/2003	3	2.2	7.62	14.45	0
1/21/2003	5	2.2	7.6	14.68	0
1/21/2003	7	2.2	7.6	14.76	0
1/21/2003	8	2.19	7.56	15.05	0
2/25/2003	1	4.62	7.01	13.04	0
2/25/2003	3	4.61	6.96	13.05	0
2/25/2003	5	4.6	6.93	13.13	0
2/25/2003	7	4.6	6.93	13.31	0
2/25/2003	9	4.61	6.89	13.37	0
2/25/2003	10	4.61	6.93	13.53	0
3/18/2003	1	11.57	7.72	10.48	0
3/18/2003	3	11.5	7.71	10.49	0
3/18/2003	5	11.4	7.69	10.68	0
3/18/2003	7	11.32	7.69	10.4	0
3/18/2003	9	11.29	7.71	10.63	0
5/27/2003	1	17.19	6.8	9.44	0
5/27/2003	3	17.17	6.86	9.46	0
5/27/2003	5	17.17	6.85	9.52	0
5/27/2003	7	17.17	6.88	9.52	0
5/27/2003	8	17.17	6.89	9.28	0
6/24/2003	1	21.53	7.68	8.7	0
6/24/2003	3	21.4	7.68	8.7	0
6/24/2003	5	21.38	7.67	8.75	0
6/24/2003	7	21.4	7.66	8.79	0
6/24/2003	9	21.41	7.67	8.87	0
7/15/2003	1	26.69	7.69	8.06	0
7/15/2003	3	26.57	7.63	8.02	0
7/15/2003	5	26.44	7.58	7.84	0
7/15/2003	7	26.41	7.56	7.79	0
7/15/2003	9	26.41	7.56	7.93	0
8/26/2003	1	29.41	8.38	7.82	0
8/26/2003	3	28.86	8.26	7.64	0
8/26/2003	5	28.35	8.15	7.62	0
8/26/2003	7	27.96	8.2	7.77	0
8/26/2003	8	27.64	8.01	7.58	0
9/24/2003	1	21.03	7.45	12.18	0
9/24/2003	3	21.03	7.45	12.18	0
9/24/2003	5	21.03	7.44	12.2	0
9/24/2003	6	21.01	7.43	12.18	0
10/28/2003	1	15.06	7.63	9.41	0
10/28/2003	3	15.07	7.63	9.46	0
10/28/2003	5	15.08	7.63	9.37	0
10/28/2003	7	15.06	7.62	9.65	0
10/28/2003	8	15.06	7.61	9.98	0
11/18/2003	1	10.47	7.57	10.33	0
11/18/2003	3	10.46	7.5	10.32	0
11/18/2003	5	10.45	7.54	10.32	0
11/18/2003	7	10.45	7.52	10.38	0
11/18/2003	9	10.45	7.52	10.49	0
12/16/2003	1	4.36	7.34	12.57	0
12/16/2003	3	4.34	7.3	12.69	0
12/16/2003	5	4.33	7.29	12.53	0
12/16/2003	7	4.34	7.25	12.38	0
12/16/2003	9	4.36	7.25	12.49	0
2/25/2004	1	6.35	7.78	12.55	0
2/25/2004	3	6.33	7.77	12.59	0
2/25/2004	5	6.34	7.75	12.76	0
2/25/2004	7	6.38	7.74	12.81	0
2/25/2004	8	6.32	7.71	12.64	0
3/23/2004	1	10.45	7.73	11.3	0
3/23/2004	3	10.32	7.75	11.27	0
3/23/2004	5	10.26	7.75	11.36	0
3/23/2004	7	10.28	7.73	11.44	0
4/20/2004	1	17.61	7.42	9.45	
4/20/2004	3	17.53	7.39	9.49	0
4/20/2004	5	17.53	7.38	9.49	0
4/20/2004	7	17.52	7.36	9.51	0
4/20/2004	8	17.55	7.38	9.68	
5/18/2004	1		8.07		
5/18/2004	3		7.73		
5/18/2004	5		7.58		
5/18/2004	7		7.62		
6/15/2004	1	25.31	7.41	7.6	0
6/15/2004	3	24.62	7.39	7.64	0
6/15/2004	5	24.58	7.4	7.63	0
6/15/2004	7	24.46	7.39	7.63	0
6/15/2004	9	24.46	7.4	7.55	0
7/20/2004	1	28.63	8.38	7.32	0
7/20/2004	3	28.49	8.3	6.96	0
7/20/2004	5	28.35	8.27	7.13	0
7/20/2004	7	28.12	8.19	7.4	0
7/20/2004	8	28.2	8.21	7.07	0
8/17/2004	1	25	7.51	6.8	0
8/17/2004	3	24.6	7.52	6.73	0
8/17/2004	5	24.3	7.5	7.02	0
8/17/2004	7	24.1	7.44	7.14	0
8/17/2004	9	24.2	7.45	7.07	0
9/21/2004	1	20.73	7.71	8.65	0
9/21/2004	3	20.55	7.71	8.62	0
9/21/2004	5	20.51	7.7	8.59	0
9/21/2004	7	20.52	7.71	8.71	0
9/21/2004	9	20.52	7.78	8.63	0
10/19/2004	1	15.89	7.93	9.26	0
10/19/2004	3	15.87	7.89	9.29	0
10/19/2004	5	15.8	7.83	9.38	0
10/19/2004	7	15.77	7.82	9.4	0
10/19/2004	8	15.76	7.86	9.44	0
11/16/2004	1	9.25	7.54	11.34	0
11/16/2004	3	9.23	7.56	11.28	0
11/16/2004	5	9.23	7.52	11.4	0
11/16/2004	7	9.21	7.5	11.37	0
11/16/2004	8	9.2	7.54	11.4	0
12/14/2004	1	8.11	7.75	11.53	0
12/14/2004	3	8.14	7.76	11.6	0
12/14/2004	5	8.13	7.71	11.61	0
12/14/2004	7	8.16	7.69	11.65	0
12/14/2004	9	8.14	7.79	11.64	0
1/26/2005	1	0.68	7.67	13.88	0
1/26/2005	3	0.68	7.67	13.89	0
1/26/2005	5	0.68	7.67	13.92	0
1/26/2005	7	0.7	7.7	13.99	0
1/26/2005	9	0.7	7.77	14.15	0
2/15/2005	1	7.26	7.74	11.62	0
2/15/2005	3	7.25	7.75	11.7	0
2/15/2005	5	7.25	7.73	11.68	0
2/15/2005	7	7.26	7.75	11.74	0
2/15/2005	8	7.2	7.79	12	0
3/22/2005	1	10.57	7.72	10.99	0
3/22/2005	3	10.34	7.71	10.95	0
3/22/2005	5	10.31	7.71	10.9	0
3/22/2005	7	10.31	7.73	10.81	0
3/22/2005	8	10.31	7.76	10.87	0
4/19/2005	1	16.3	7.6	9.18	0
4/19/2005	3	16.3	7.58	9.2	0
4/19/2005	5	16.2	7.6	9.33	0
4/19/2005	7	16.2	7.6	9.3	0
4/19/2005	8	16.2	7.62	9.26	0
5/24/2005	1	20	7.45	7.94	0
5/24/2005	3	19.99	7.42	8	0
5/24/2005	5	19.98	7.41	7.98	0
5/24/2005	7	19.99	7.52	8.07	0
5/24/2005	9	19.99	7.6	8.12	0
6/21/2005	1	26.9	7.81	7.55	0
6/21/2005	3	25.9	7.68	7.34	0
6/21/2005	5	25.5	7.55	7.22	0
6/21/2005	7	25.1	7.44	7.22	0
6/21/2005	9	25	7.48	7.24	0
7/19/2005	1	33.12	7.86	7.24	0
7/19/2005	3	31.26	7.54	6.67	0
7/19/2005	5	30.81	7.43	6.61	0
7/19/2005	7	30.82	7.45	6.63	0
7/19/2005	8	30.82	7.47	6.57	0
8/23/2005	1	29.8	7.7	6.66	0
8/23/2005	3	29.7	7.68	6.62	0
8/23/2005	5	29.6	7.7	6.66	0
8/23/2005	7	29.6	7.64	6.61	0
8/23/2005	9	29.6	7.62	6.6	0
9/20/2005	1	28.1	7.9	7.06	0
9/20/2005	3	27.9	7.82	6.83	0
9/20/2005	5	27.9	7.78	6.83	0
9/20/2005	7	27.9	7.77	6.8	0
10/18/2005	1	18.9	7.72	8.76	0
10/18/2005	3	18.8	7.66	8.25	0
10/18/2005	5	18.8	7.31	6.04	0
10/18/2005	6	18.8	7.3	5.49	0
11/15/2005	0.3		7.77	9.78	
11/15/2005	1	14.6	7.77	9.78	0
11/15/2005	3	14.5	7.76	9.75	0
11/15/2005	5	14.38	7.78	9.8	0
11/15/2005	7	14.2	7.81	9.76	0
11/15/2005	9	14.3	7.88	9.78	0
12/13/2005	1	3.85	7.17	12.93	
12/21/2005	1	2.9	7.56	13.36	0
12/21/2005	3	2.9	7.55	13.35	0
12/21/2005	5	2.9	7.54	13.29	0
12/21/2005	7	2.9	7.52	13.34	0
12/21/2005	8	2.8	7.49	13.56	0
1/17/2006	1	5.9	7.54	12.57	0
1/17/2006	3	5.9	7.52	12.59	0
1/17/2006	5	5.8	7.39	12.61	0
1/17/2006	7	5.8	7.32	12.54	0
1/17/2006	8	5.8	7.33	12.79	0
2/21/2006	1	6	7.21	12.4	0
2/21/2006	3	6.03	7.1	12.44	0
2/21/2006	5	6.32	7.2	12.43	0
2/21/2006	7	6.21	7.1	12.5	0
2/21/2006	8	6.1	7.11	12.61	0
3/20/2006	1	12.9	8.1	10.2	
3/20/2006	3	12.9	8.1	10.2	
3/20/2006	5	12.8	8.1	10.3	
3/20/2006	7	12.6	8	10.3	
4/26/2006	1	19.9	7.6	8	0
4/26/2006	3	19.8	7.6	8.1	0
4/26/2006	5	19.8	7.6	8	0
4/26/2006	7	19.8	7.6	8.1	0
4/26/2006	9	19.8	7.6	8.1	0
5/15/2006	1	20.6	7.6	7.7	0
5/15/2006	3	20	7.6	7.7	0
5/15/2006	5	19.9	7.6	7.7	0
5/15/2006	7	19.9	7.6	7.6	0
5/15/2006	8	19.9	7.6	7.6	0
6/21/2006	0.3	28.4	7.8	7	0
7/24/2006	1	29.8	7.9	6.9	0
7/24/2006	3	29.2	7.9	6.8	0
7/24/2006	5	28.6	7.6	6.4	0
7/24/2006	7	28.5	7.6	6.4	0
7/24/2006	9	28.4	7.6	6.4	0
8/22/2006	1	28.8	7.9	7.3	0
8/22/2006	3	28.8	7.9	7.3	0
8/22/2006	5	28.8	7.9	7.3	0
8/22/2006	7	28.8	7.9	7.2	0
8/22/2006	8	28.8	7.8	7	0
9/27/2006	1	22.5	8.1	8.7	0
10/30/2006	1	12.2	7.5	10.2	0
10/30/2006	3	12.1	7.5	10.2	0
10/30/2006	5	12.1	7.5	10.3	0
10/30/2006	7	12.1	7.5	10.4	0
11/15/2006	1	12.7	7.4	9.8	0
11/15/2006	3	12.7	7.4	9.8	0
11/15/2006	5	12.7	7.4	9.9	0
11/15/2006	7	12.7	7.4	9.8	0
11/15/2006	9	12.7	7.4	10	0
12/18/2006	1	8.1	7.3	12	0
1/24/2007	1	4.3	7.8	12.4	0
1/24/2007	3	4.2	7.8	12.4	0
1/24/2007	5	4.2	7.8	12.5	0
1/24/2007	7	4.2	7.8	12.6	0
2/20/2007	1	2.4	7.2	13.4	0
2/20/2007	3	2.4	7.2	13.4	0
2/20/2007	5	2.4	7.1	13.4	0
2/20/2007	6	2.4	7	13.5	0
3/19/2007	1	8.6	7.2	11.7	0
3/19/2007	3	8.5	7	11.6	0
3/19/2007	5	8.5	7	11.6	0
3/19/2007	7	8.5	7	11.6	0
3/19/2007	9	8.5	6.9	11.7	0
4/30/2007	1	19.8	7.6	8.6	0
4/30/2007	3	19	7.6	8.8	0
4/30/2007	5	19	7.5	8.8	0
4/30/2007	7	18.8	7.5	8.8	0
4/30/2007	8	18.8	7.5	8.8	0
5/30/2007	1	28.6	8.4	7.1	0
5/30/2007	2	28	8.2	6.8	0
5/30/2007	3	27.8	8.1	6.9	0
5/30/2007	4	27.7	8	6.9	0
5/30/2007	5	27.4	7.9	7	0
5/30/2007	6	27.1	7.8	6.9	0
5/30/2007	7	27	7.7	6.9	0
5/30/2007	8	27	7.7	6.9	0
6/18/2007	1	26.7	8.3	7.5	0
6/18/2007	2	26.4	8.2	7.6	0
6/18/2007	3	26.3	8.1	7.7	0
6/18/2007	4	26.1	8	7.6	0
6/18/2007	5	26	7.9	7.9	0
6/18/2007	6	25.9	7.8	7.5	0
6/18/2007	7	25.2	7.4	7.4	0
7/23/2007	1	28.2	8.1	7.5	0
7/23/2007	2	27.8	8	7.4	0
7/23/2007	3	27.4	7.9	7.4	0
7/23/2007	4	27.3	7.9	7.3	0
7/23/2007	5	27	7.8	7.3	0
7/23/2007	6	26.9	7.7	7.2	0
8/20/2007	1	27.8	7.4	5.8	0
8/20/2007	2	27.8	7.4	5.8	0
8/20/2007	3	27.7	7.4	5.8	0
8/20/2007	4	27.7	7.4	5.7	0
8/20/2007	5	27.6	7.4	5.7	0
8/20/2007	6	27.6	7.4	5.7	0
8/20/2007	7	27.6	7.4	5.7	0
9/24/2007	1	24.1	7.9	7.5	
9/24/2007	2	24.3	7.9	7.6	
9/24/2007	3	24.1	7.9	7.5	
9/24/2007	4	24	7.9	7.5	
9/24/2007	5	24	7.8	7.4	
9/24/2007	6	24	7.8	7.4	
9/24/2007	7	23.8	7.8	7.2	
9/24/2007	8	23.7	7.7	7.2	
10/22/2007	1	22.8	8.1	8.9	0
10/22/2007	2	22	7.8	7.7	0
10/22/2007	3	21.9	7.7	7.6	0
10/22/2007	4	21.8	7.7	7.6	0
10/22/2007	5	21.8	7.8	7.7	0
10/22/2007	6	21.8	7.8	7.7	0
10/22/2007	7	21.7	7.8	7.9	0
10/22/2007	8	21.7	7.8	7.9	0
11/13/2007	1	10.8	7.8	10.7	0

Continued on next page . . .

Data from James River Monitoring Station 2-JMS104.16
Kinder Morgan Transmix Co., LLC - VA0086151

Collection Date	Depth (meters)	Temp. (°C)	pH (SU)	Dissolved Oxygen (mg/L)	Salinity (g/kg)
11/13/2007	2	10.6	7.8	10.6	0
11/13/2007	3	10.6	7.8	10.6	0
11/13/2007	4	10.5	7.8	10.7	0
11/13/2007	5	10.4	7.8	10.8	0
11/13/2007	6	10.4	7.8	10.8	0
11/13/2007	7	10.4	7.8	10.8	0
12/10/2007	1	6.5	7.6	12.2	0
12/10/2007	2	6.5	7.5	12.1	0
12/10/2007	3	6.5	7.5	12	0
12/10/2007	4	6.4	7.5	11.9	0
12/10/2007	5	6.3	7.5	11.9	0
12/10/2007	6	6.3	7.5	11.9	0
12/10/2007	7	6.4	7.5	12	0
12/10/2007	8	6.4	7.5	12.1	0
1/23/2008	1	3	7.3	13.5	0
1/23/2008	2	3	7.4	13.5	0
1/23/2008	3	3	7.3	13.6	0
1/23/2008	4	3	7.3	13.6	0
1/23/2008	5	3.1	7.3	13.7	0
1/23/2008	6	3.1	7.4	13.7	0
1/23/2008	7	3.1	7.4	13.7	0
2/14/2008	1	5.5	7	12.2	0
2/14/2008	2	5.4	7	12.3	0
2/14/2008	3	5.4	7	12.2	0
2/14/2008	4	5.4	7	12.2	0
2/14/2008	5	5.4	7	12.2	0
2/14/2008	6	5.4	7	12.2	0
2/14/2008	7	5.4	7	12.2	0
3/18/2008	1	12.8	7	10.3	0
3/18/2008	2	12.7	7	10.3	0
3/18/2008	3	12.6	7	10.3	0
3/18/2008	4	12.4	6.9	10.3	0
3/18/2008	5	12.1	6.9	10.3	0
3/18/2008	6	12.1	6.9	10.3	0
3/18/2008	7	12.1	6.9	10.3	0
3/18/2008	8	12.1	6.9	10.2	0
4/15/2008	1	16.2	6.9	9.1	0
4/15/2008	2	16	6.8	9.1	0
4/15/2008	3	16	6.8	9	0
4/15/2008	4	16	6.8	9	0
4/15/2008	5	16	6.8	9	0
4/15/2008	6	15.9	6.8	9	0
4/15/2008	7	15.9	6.8	9	0
4/15/2008	8	15.9	6.8	9	0
5/22/2008	1	19.1	7.6	8.7	
5/22/2008	2	19	7.6	8.8	
5/22/2008	3	18.9	7.6	8.8	
5/22/2008	4	18.9	7.6	8.8	
5/22/2008	5	18.9	7.6	8.9	
5/22/2008	6	18.9	7.6	8.8	
6/17/2008	1	29.7	7.6	6	0
6/17/2008	2	29.5	7.6	5.7	0
6/17/2008	3	29.4	7.6	5.7	0
6/17/2008	4	29.4	7.6	5.6	0
6/17/2008	5	29.4	7.5	5.7	0
6/17/2008	6	29.4	7.5	5.8	0
7/15/2008	1	29.3	8.1	6.5	0
7/15/2008	2	29	8	6.5	0
7/15/2008	3	28.7	8	6.5	0
7/15/2008	4	28.6	7.9	6.4	0
7/15/2008	5	28.5	7.9	6.2	0
7/15/2008	6	28.5	7.9	6.3	0
7/15/2008	7	28.5	7.9	6.3	0
7/15/2008	8	28.5	7.9	6.3	0
9/16/2008	1	26.4	7.4	6	0
9/16/2008	2	26.4	7.4	6	0
9/16/2008	3	26.4	7.4	6	0
9/16/2008	4	26.4	7.4	6	0
9/16/2008	5	26.4	7.3	6	0
9/16/2008	6	26.4	7.3	6	0
9/16/2008	7	26.4	7.3	6	0
9/16/2008	8	26.4	7.3	6	0
9/16/2008	9	26.4	7.3	6	0
10/21/2008	1	18.2	7.7	8	0
10/21/2008	2	18.1	7.7	7.9	0
10/21/2008	3	18	7.7	7.9	0
10/21/2008	4	17.4	7.7	8.3	0
10/21/2008	5	17.3	7.7	8.5	0
10/21/2008	6	17.3	7.7	8.7	0
10/21/2008	7	17.3	7.7	9	0
11/24/2008	1	5.9	7.8	13.3	0
11/24/2008	2	5.9	7.8	13.2	0
11/24/2008	3	5.9	7.8	13.3	0
11/24/2008	4	5.9	7.8	13.2	0
11/24/2008	5	5.9	7.8	13.2	0
11/24/2008	6	5.9	7.8	13.3	0
11/24/2008	7	5.8	7.8	13.3	0
11/24/2008	8	5.9	7.9	13.4	0
12/9/2008	1	4.2	7.9	13.9	0
12/9/2008	2	4.2	8	13.9	0
12/9/2008	3	4.2	8	13.9	0
12/9/2008	4	4.2	8	13.9	0
12/9/2008	5	4.2	8	13.9	0
12/9/2008	6	4.2	8.1	14	0
12/9/2008	7	4.2	8.1	13.9	0
1/21/2009	1	0.9	7.5	14	0
1/21/2009	2	0.9	7.5	14	0
1/21/2009	3	0.9	7.5	14	0
1/21/2009	4	0.9	7.5	14	0
1/21/2009	5	0.9	7.4	14.1	0
1/21/2009	6	0.9	7.4	14.2	0

Collection Date	Depth (meters)	Temp. (°C)	pH (SU)	Dissolved Oxygen (mg/L)	Salinity (g/kg)
1/21/2009	7	0.9	7.4	14.3	0
1/21/2009	8	0.9	7.4	14.4	0
1/21/2009	9	0.9	7.4	14.4	0
2/19/2009	1	7.3	6.9	11.5	0
2/19/2009	2	7.3	6.8	11.5	0
2/19/2009	3	7.3	6.8	11.6	0
2/19/2009	4	7.3	6.8	11.8	0
2/19/2009	5	7.6	6.5	11.8	0
2/19/2009	6	7.6	6.5	11.6	0
2/19/2009	7	7.6	6.5	11.7	0
2/19/2009	8	7.4	6.2	11.3	0
3/17/2009	1	9.3	7.5	10.7	0
3/17/2009	2	9.3	7.5	10.7	0
3/17/2009	3	9.3	7.5	10.8	0
3/17/2009	4	9.3	7.5	10.8	0
3/17/2009	5	9.3	7.5	10.7	0
3/17/2009	6	9.3	7.5	10.8	0
3/17/2009	7	9.3	7.5	10.7	0
3/17/2009	8	9.2	7.4	10.9	0
3/17/2009	9	9.2	7.5	11	0
4/30/2009	1	20.4	7.4	8.6	
4/30/2009	2	20.4	7.4	8.6	
4/30/2009	3	20.2	7.4	8.6	
4/30/2009	4	20.2	7.4	8.6	
4/30/2009	5	20.1	7.4	8.6	
4/30/2009	6	20.1	7.4	8.6	
4/30/2009	7	20.1	7.4	8.6	
5/19/2009	1	18.8	7.6	9.4	
5/19/2009	2	18.7	7.6	9.4	
5/19/2009	3	18.7	7.7	9.5	
5/19/2009	4	18.7	7.7	9.5	
5/19/2009	5	18.7	7.7	9.5	
5/19/2009	6	18.7	7.7	9.4	
5/19/2009	7	18.7	7.7	9.4	
5/19/2009	8	18.7	7.7	9.2	
6/16/2009	1	25.2	7.4	7.7	
6/16/2009	2	25	7.4	7.8	
6/16/2009	3	25	7.4	7.8	
6/16/2009	4	24.9	7.4	7.7	
6/16/2009	5	25	7.4	7.5	
6/16/2009	6	25	7.4	7.3	
6/16/2009	7	25	7.4	7.3	
7/21/2009	1	28.3	7.7	6.5	
7/21/2009	2	28.1	7.7	6.5	
7/21/2009	3	28.1	7.7	6.6	
7/21/2009	4	28	7.7	6.6	
7/21/2009	5	28	7.7	6.5	
7/21/2009	6	28	7.7	6.4	
7/21/2009	7	28	7.7	6.3	
7/21/2009	8	28	7.7	6.4	
8/18/2009	1	30.3	8.5	7.6	
8/18/2009	2	29.4	8.1	6.6	
8/18/2009	3	29.3	8	6.6	
8/18/2009	4	29.3	7.9	6.4	
8/18/2009	5	29.2	7.9	6.4	
8/18/2009	6	29.2	7.9	6.3	
8/18/2009	7	29.2	8	6.3	
8/18/2009	8	29.2	8	6.3	
9/15/2009	1	24.5	7.9		
9/15/2009	2	23.8	7.8		
9/15/2009	3	23.8	7.7		
9/15/2009	4	23.7	7.8		
9/15/2009	5	23.7	7.8		
9/15/2009	6	23.7	7.8		
9/15/2009	7	23.7	7.8		
9/15/2009	8	23.7	7.8		
9/15/2009	9	23.7	7.8		
10/28/2009	1	16.6	7.6	8.1	
10/28/2009	2	16.2	7.6	8	
10/28/2009	3	16	7.6	7.9	
10/28/2009	4	16	7.6	7.9	
10/28/2009	5	16	7.6	7.9	
10/28/2009	6	16	7.6	8	
10/28/2009	7	16	7.6	8.2	
11/9/2009	1	13.4	7.8		
11/9/2009	2	13.2	7.8		
11/9/2009	3	13	7.8		
11/9/2009	4	13	7.8		
11/9/2009	5	13	7.8		
11/9/2009	6	12.9	7.8		
11/9/2009	7	13	7.8		
11/9/2009	8	12.9	7.8		
12/8/2009	1	6.6	6.9	12.1	
12/8/2009	2	6.6	6.9	12.1	
12/8/2009	3	6.6	6.9	12.1	
12/8/2009	4	6.6	6.8	12.2	
12/8/2009	5	6.6	6.8	12.2	
12/8/2009	6	6.6	6.8	12.2	
12/8/2009	7	6.6	6.7	12.2	
1/25/2010	1	7.5	7.5	11.1	
1/25/2010	2	7.4	7.5	11	
1/25/2010	3	7.4	7.5	10.9	
1/25/2010	4	7.4	7.5	10.9	
1/25/2010	5	7.4	7.5	10.8	
1/25/2010	6	7.4	7.5	10.7	
1/25/2010	7	7.4	7.4	10.6	
1/25/2010	8	7.4	7.4	10.6	
2/17/2010	1	2.8	7.6	12.8	
2/17/2010	2	2.8	7.6	12.8	
2/17/2010	3	2.7	7.6	12.8	
2/17/2010	4	2.7	7.6	12.8	

Collection Date	Depth (meters)	Temp. (°C)	pH (SU)	Dissolved Oxygen (mg/L)	Salinity (g/kg)
2/17/2010	5	2.7	7.6	12.8	
2/17/2010	6	2.7	7.6	12.9	
2/17/2010	7	2.7	7.5	12.9	
3/4/2010	1	5.6	7.7	12.7	
3/4/2010	2	5.7	7.6	12.7	
3/4/2010	3	5.6	7.6	12.7	
3/4/2010	4	5.6	7.6	12.7	
3/4/2010	5	5.6	7.6	12.7	
3/4/2010	6	5.6	7.6	12.7	
3/4/2010	7	5.6	7.6	12.7	
3/4/2010	8	5.6	7.6	12.7	
4/6/2010	1	18.5	7.6	9.5	
4/6/2010	2	18.4	7.6	9.5	
4/6/2010	3	18.3	7.5	9.4	
4/6/2010	4	18.3	7.5	9.4	
4/6/2010	5	18.3	7.5	9.4	
4/6/2010	6	18.3	7.5	9.4	
4/6/2010	7	18.3	7.5	9.4	
5/4/2010	1	23.7	8.4		
5/4/2010	2	23.6	8.3		
5/4/2010	3	23.6	8.3		
5/4/2010	4	23.5	8.2		
5/4/2010	5	23.5	8.1		
5/4/2010	6	23.5	8.1		
5/4/2010	7	23.5	8.1		
6/2/2010	1	26.5	7.5		
6/2/2010	2	26.3	7.4		
6/2/2010	3	26.2	7.4		
6/2/2010	4	26.2	7.4		
6/2/2010	5	26.2	7.4		
6/2/2010	6	26.2	7.4		
7/7/2010	1	30.8	8.6	9.8	
7/7/2010	2	30.5	8.5	9.5	
7/7/2010	3	30.2	8.4	9.1	
7/7/2010	4	30.1	8.2	8.7	
7/7/2010	5	29.4	7.8	7.7	
7/7/2010	6	28.8	7.4	6	
7/7/2010	7	28.7	7.3	5.7	
7/7/2010	8	28.6	7.3	5.1	
8/3/2010	1	29	8	8.2	
8/3/2010	2	28.5	7.8	7.5	
8/3/2010	3	28.2	7.7	7.2	
8/3/2010	4	28.1	7.7	7	
8/3/2010	5	28.1	7.7	7	
8/3/2010	6	28.1	7.7	7	
8/3/2010	7	28.1	7.7	6.9	
9/8/2010	1	27.3	8.1	7.9	
9/8/2010	2	27.3	8.1	7.8	
9/8/2010	3	27.3	8	7.8	
9/8/2010	4	27.2	8	7.4	
9/8/2010	5	27.2	8	7.6	
9/8/2010	6	27.1	7.9	7.4	
9/8/2010	7	27.1	7.9	7.4	
10/5/2010	1	18.6	7.7	9.5	
10/5/2010	2	18.3	7.7	9.4	
10/5/2010	3	18.4	7.7	9.4	
10/5/2010	4	18.4	7.7	9.4	
10/5/2010	5	18.2	7.7	9.4	
10/5/2010	6	18.2	7.7	9.4	
10/5/2010	7	18.2	7.7	9.3	
10/5/2010	8	18.2	7.7	9.3	
10/5/2010	9	18.2	7.7	9.3	
11/2/2010	1	14.7	7.8	10.2	0
11/2/2010	2	14.7	7.8	10.2	0
11/2/2010	3	14.7	7.8	10.2	0
11/2/2010	4	14.6	7.8	10.2	0
11/2/2010	5	14.5	7.8	10.2	0
11/2/2010	6	14.4	7.8	10.3	0
11/2/2010	7	14.4	7.8	10.3	0
11/2/2010	8	14.4	7.8	10.3	0
11/2/2010	9	14.3	7.8	10.3	0
1/4/2011	1	3.3	7.8	13.7	
1/4/2011	2	3.3	7.8	13.7	
1/4/2011	3	3.3	7.8	13.7	
1/4/2011	4	3.3	7.8	13.7	
1/4/2011	5	3.3	7.8	13.7	
1/4/2011	6	3.3	7.8	13.7	
1/4/2011	7	3.3	7.8	13.7	
2/1/2011	1	3.9	7.6	13.3	
2/1/2011	2	3.9	7.6	13.3	
2/1/2011	3	3.8	7.6	13.3	
2/1/2011	4	3.8	7.6	13.3	
2/1/2011	5	3.8	7.5	13.3	
2/1/2011	6	3.8	7.5	13.3	
2/1/2011	7	3.8	7.5	13.3	
2/1/2011	8	3.8	7.5	13.3	
2/1/2011	9	3.8	7.4	13.2	

	Temp. (°C)	pH (SU)
90th Percentile	28.7	8.0
10th Percentile	5.4	7.2

Data from James River Monitoring Station 2-JMS104.16
Kinder Morgan Transmix Co., LLC - VA0086151

Collection Date	Hardness (mg/L)	Collection Date	Hardness (mg/L)	Collection Date	Hardness (mg/L)	Collection Date	Hardness (mg/L)
2/17/1994	42	6/24/1997	60.1	8/22/2000	65.2	12/16/2003	40
3/21/1994	55	7/15/1997	76.2	9/26/2000	139.7	2/25/2004	63.5
4/14/1994	50	8/19/1997	67.7	10/24/2000	81.5	3/23/2004	53.4
5/23/1994	50	9/23/1997	60.7	11/28/2000	104	4/20/2004	98.9
6/9/1994	66	10/21/1997	70.2	1/23/2001	53.4	5/18/2004	58
9/8/1994	96	11/18/1997	57.9	2/20/2001	54	6/15/2004	48
10/17/1994	83	12/10/1997	70.8	3/27/2001	30.3	7/20/2004	62.7
11/30/1994	69	1/21/1998	44.3	4/24/2001	48	8/17/2004	58.6
12/6/1994	75	3/17/1998	42.3	6/19/2001	52.8	9/21/2004	63.1
1/25/1995	53	4/21/1998	33.9	7/24/2001	44.9	10/19/2004	34
2/27/1995	54	5/19/1998	46.3	8/21/2001	59.5	11/16/2004	44
3/23/1995	56	6/23/1998	62.5	9/18/2001	55.7	12/14/2004	50
4/18/1995	65	7/21/1998	81.4	10/16/2001	120	1/26/2005	56
5/23/1995	40	8/18/1998	71	11/27/2001	52.7	2/15/2005	70
6/20/1995	57	9/22/1998	87.8	12/12/2001	109	3/22/2005	56
7/18/1995	66	10/20/1998	134	1/22/2002	85	4/19/2005	58.2
8/23/1995	90	11/18/1998	83	2/19/2002	44.1	5/24/2005	44
9/21/1995	110	12/15/1998	76	3/19/2002	56.5	6/21/2005	80
10/19/1995	59	1/19/1999	78	4/16/2002	105.1	7/19/2005	64
11/20/1995	65	2/23/1999	60	5/30/2002	66.4	8/23/2005	68
12/14/1995	47	3/23/1999	48	6/25/2002	100	9/20/2005	110
1/29/1996	26	4/20/1999	68	7/23/2002	114	10/18/2005	56
2/20/1996	86	5/20/1999	62	8/13/2002	118	11/15/2005	102
3/25/1996	56	6/22/1999	62.7	9/24/2002	107	12/21/2005	52
4/29/1996	59	7/20/1999	85.8	10/22/2002	128	1/17/2006	76
5/15/1996	50	8/17/1999	96.5	11/19/2002	32.3	2/21/2006	55
6/18/1996	50	9/21/1999	36.5	12/10/2002	66.8	3/20/2006	64
7/23/1996	59	10/28/1999	70.6	1/21/2003	56.3	4/26/2006	51
8/20/1996	85	11/18/1999	119.3	2/25/2003	46.7	5/15/2006	54
9/24/1996	56	12/21/1999	51.6	3/18/2003	54.3	7/24/2006	90
10/22/1996	49	1/18/2000	63.9	5/27/2003	34.6	8/22/2006	106
11/19/1996	58	2/23/2000	51	6/24/2003	49.2	10/30/2006	52
12/10/1996	41	3/28/2000	84	7/15/2003	50	11/15/2006	38
2/18/1997	38.2	4/24/2000	39	8/26/2003	56.2	1/24/2007	56
3/18/1997	61.5	5/23/2000	54	9/24/2003	22.8		
4/22/1997	64.9	6/20/2000	60.1	10/28/2003	70.4	MEAN =	65.2
5/28/1997	56	7/18/2000	78	11/18/2003	48		

Attachment C

Flow Frequency Memorandum, 303(d) Fact Sheets

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
Kinder Morgan Operating LP "A" Deepwater Terminal – VA0086151

TO: Jeremy Kazio

FROM: Jennifer Palmore, P.G.

DATE: February 4, 2011

COPIES: File

The Kinder Morgan - Deepwater Terminal facility currently discharges via Outfall 002 to the James River in Richmond, VA. The outfall is located at rivermile 2-JMS106.22. Flow frequencies have been requested for use in developing effluent limitations for the VPDES permit.

The James River is tidally influenced at the discharge point. Flow frequencies cannot be determined for tidal waters; therefore, default dilution ratios should be used to evaluate the effluent's impact on the water body. The river is designated as tidal freshwater; therefore the Aquatic Life Use freshwater criteria should be applied.

The freshwater inflow at the fall line of the James River (I-95 bridge) is included. The flow frequencies were developed based on a drainage area comparison between the fall line and the USGS continuous record gage on the James River at the Route 45 bridge in Cartersville (#02035000). The Cartersville gage has been in operation from 1898 through present. However, because the flow in the James is currently regulated by guaranteed releases from Gathwright Dam (Lake Moomaw), the flow frequencies for the gage were developed by the Charlottesville office based on data since 1979 only. The data for the reference gage and the fall line are presented below.

James River at Cartersville, VA (#02035000):
Period of record 1980-2003
Drainage area = 6,257 mi^2

1Q30 = 540 cfs	High Flow 1Q10 =1530 cfs
1Q10 = 638 cfs	High Flow 7Q10 = 1810 cfs
7Q10 = 717 cfs	High Flow 30Q10 = 2220 cfs
30Q10 = 918 cfs	HM = 3020 cfs
30Q5 = 1020 cfs	

James River at fall line:
Drainage Area = 6,755 mi^2

1Q30 = 583 cfs (377 MGD)	High Flow 1Q10 =1652 cfs (1068 MGD)
1Q10 = 689 cfs (445 MGD)	High Flow 7Q10 = 1954 cfs (1263 MGD)
7Q10 = 774 cfs (500 MGD)	High Flow 30Q10 = 2397 cfs (1549 MGD)
30Q10 = 991 cfs (641 MGD)	HM = 3260 cfs (2107 MGD)
30Q5 = 1101 cfs (712 MGD)	

This analysis does not address any withdrawals, discharges, or springs influencing the flow of the James River between Cartersville and the fall line. The high flow months are January through May.

During the 2008 305(b)/303(d) Water Quality Assessment, the segment was assessed as a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") The applicable fact sheets are attached. The Aquatic Life Use is impaired due to inadequate submerged aquatic vegetation (SAV) and exceedance of the chlorophyll a criteria. The Recreation Use is impaired due to E. coli. The Fish Consumption Use is impaired due to a VDH fish consumption advisory for PCBs; in addition, kepone and mercury are considered non-impairing observed effects due to a VDH advisory and screening level exceedance, respectively. The Wildlife Use is fully supporting.

During the draft 2010 305(b)/303(d) Water Quality Assessment, the segment remains assessed as a Category 5A water. The applicable fact sheets are attached. The Aquatic Life Use is impaired due to inadequate submerged aquatic vegetation (SAV), exceedance of the chlorophyll a criteria, and violation of the 30-day mean Open Water summer dissolved oxygen criteria. The Recreation Use is impaired due to E. coli. The Fish Consumption Use is impaired due to a VDH fish advisory for PCBs; in addition, mercury and kepone are considered non-impairing observed effects. The Wildlife Use is fully supporting.

The bacterial TMDL for the James River was approved by the EPA on 11/4/2010. Kinder Morgan was included in the TMDL; however it was determined that they do not need a wasteload allocation because their current permit does not require fecal coliform control. The Chesapeake Bay TMDL was approved by the EPA on 12/29/2010. The facility was included as part of the aggregated allocations for total nitrogen, total phosphorus, and total suspended solids for the upper tidalfreshwater James River segment.

Water quality data from monitoring station 2-JMS104.16 is attached. The station is located on the James River at Buoy 166, which is approximately 2 miles downstream of the outfall.

The river is considered a Tier 1 water. The Richmond-Crater Water Quality Management Plan allocates BOD and ammonia in order to maintain a minimum dissolved oxygen of 5.0 mg/L in the river.

If you have any questions concerning this analysis, please let me know.

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **James River**

TMDL ID: **G01E-01-BAC** **2010 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2010

IMPAIRED SIZE: 6.2581 - Sq. Mi. **Watershed:** VAP-G01E

INITIAL LISTING: 1996

UPSTREAM LIMIT: Fall Line (Mayos Bridge)

DOWNSTREAM LIMIT: Appomattox River

Estuarine James River from the fall line at Mayos Bridge downstream to the Appomattox River.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Recreation Use - Not Supporting

IMPAIRMENT: E.coli

The James River from the fall line to the Appomattox River has been assessed as not supporting of the Recreation use support goal based on the results of a summer special study in the fall zone. The special study was designed to monitor the effects of summertime rain and combined sewer overflow (CSO) events on water quality in the James River and to monitor the effects of Richmond's CSO abatement efforts.

The segment has been included on the Impaired Waters list for fecal coliform since 1996. During the 2004 and 2006 cycles, the bacteria standard changed to E.coli for those stations with enough data. Some of the areas in this segment had converted to the E.coli standard, for others the fecal coliform standard was still in effect. During the 2008 cycle, the impairment was converted solely to E. coli. The TMDL for bacteria is due in 2010.

Bacteria impairment is noted at the following stations during the 2010 cycle:
2-JMS110.30
2-JMS104.16
2-JMS099.30

Although station 2-JMS087.01 is currently passing (5/50), the downstream extent will remain the same for this cycle due to the historical impairment and the marginal passing rate.

Farrar Gut was mistakenly combined with the mainstem in previous assessments. The stream is a separate waterbody and should not be included in the bacterial impairment, which only included the "estuarine James River".

IMPAIRMENT SOURCE: NPS - Urban, CSO

The source of the impairment in this section of the river is believed to be urban runoff from the tributary drainage basin and from combined sewer overflow events from the City of Richmond's combined sewer system.

The City is currently undertaking CSO abatement efforts. It is recommended that the ongoing CSO special study be continued to gauge the effects of CSO abatement efforts on water quality in this segment.

RECOMMENDATION: Problem Characterization

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **James River Tidal Freshwater (Upper) Estuary**

TMDL ID: **JMSTFU-DO-BAY** **2010 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2010

IMPAIRED SIZE: 6.5749 - Sq. Mi. **Watershed:** VAP-G01E

INITIAL LISTING: 1998

UPSTREAM LIMIT: Fall line

DOWNSTREAM LIMIT: Tidal Freshwater/Oligohaline Boundary

The James River Tidal Freshwater Upper estuary, which extends from the fall line to approximately the Appomattox River, including tributaries.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting

IMPAIRMENT: Dissolved Oxygen

The mainstem James River from the Appomattox River to the Chickahominy River was originally listed on the 1998 list as fully supporting but threatened of the Aquatic Life Use goal based on chlorophyll_a exceedances. During the 1998 cycle, EPA extended the segment upstream to the fall line and downgraded the river to not supporting the Aquatic Life Use, citing nutrient concerns.

In previous cycles, the mainstem James River had acceptable dissolved oxygen levels. In addition the entire tidal freshwater portion (fall line to just above the Chickahominy River) has good benthic community based on the results from the Chesapeake Bay Benthic Index of Biological Community; therefore the James River from the fall line to the oligohaline boundary was considered impaired solely for Nutrients/Eutrophication Biological Indicators (EPA Overlist).

The CB water quality standards were implemented during the 2006 cycle. The 30-day dissolved oxygen criteria was met during the 2006 and 2008 cycles; however, during the 2010 cycle, the segment failed the summer 30-day Open Water dissolved oxygen criteria. The rest-of-year standard was met.

IMPAIRMENT SOURCE: Nonpoint Source, Point Source

The tributary strategy for the James River assigned sources and allocations.

RECOMMENDATION: Problem Characterization

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **James River Tidal Freshwater (Upper) Estuary**

TMDL ID: **JMSTFU-SAV-BAY** **2010 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2010

IMPAIRED SIZE: 6.5998 - Sq. Mi. **Watershed:** VAP-G01E

INITIAL LISTING: 1998

UPSTREAM LIMIT: Fall line

DOWNSTREAM LIMIT: Tidal Freshwater/Oligohaline Boundary

The James River Tidal Freshwater Upper estuary, which extends from the fall line to approximately the Appomattox River, including tributaries.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Shallow Water Use - Not Supporting

IMPAIRMENT: Aquatic Macrophytes

The mainstem James River from the Appomattox River to the Chickahominy River was originally listed on the 1998 list as fully supporting but threatened of the Aquatic Life Use goal based on chlorophyll_a exceedances. During the 1998 cycle, EPA extended the segment upstream to the fall line and downgraded the river to not supporting the Aquatic Life Use, citing nutrient concerns.

In previous cycles, the mainstem James River had acceptable dissolved oxygen levels. In addition the entire tidal freshwater portion (fall line to just above the Chickahominy River) has good benthic community based on the results from the Chesapeake Bay Benthic Index of Biological Community; therefore the James River from the fall line to the oligohaline boundary was considered impaired solely for Nutrients/Eutrophication Biological Indicators (EPA Overlist).

During the 2006 cycle, the CB water quality standards were implemented. The Upper Tidal Freshwater James River from the fall line to the Appomattox fails the Shallow Water Use SAV criteria.

IMPAIRMENT SOURCE: Nonpoint Source, Point Source

The tributary strategy for the James River assigned sources and allocations.

RECOMMENDATION: Problem Characterization

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin

HYDROLOGIC UNIT: 02080206

STREAM NAME: **James River**

TMDL ID: **G01E-02-CHLA**

2010 IMPAIRED AREA ID: CB-JMSTFU

ASSESSMENT CATEGORY: 5A

TMDL DUE DATE: 2010

IMPAIRED SIZE: 5.5117 - Sq. Mi.

Watershed: VAP-G01E

INITIAL LISTING: 2008

UPSTREAM LIMIT: Fall Line (Mayos Bridge)

DOWNSTREAM LIMIT: Appomattox River

Mainstem James River from the fall line at Mayos Bridge downstream to the JMSTFu/JMSTFl boundary at the Appomattox River.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Open Water Subuse - Not Supporting

IMPAIRMENT: Chlorophyll

The James River from the Appomattox River to the Chickahominy River was originally listed on the 1998 list as fully supporting but threatened of the Aquatic Life Use goal based on chlorophyll_a exceedances. During the 1998 cycle, EPA extended the segment upstream to the fall line and downgraded the river to not supporting the Aquatic Life Use, citing nutrient concerns.

In previous cycles, the mainstem James River had acceptable dissolved oxygen levels. In addition the entire tidal freshwater portion (fall line to just above the Chickahominy River) has good benthic community based on the results from the Chesapeake Bay Benthic Index of Biological Community; therefore the James River from the fall line to the oligohaline boundary was considered impaired solely for Nutrients/Eutrophication Biological Indicators (EPA Overlist).

A special site-specific chlorophyll standard for the mainstem James River was adopted during the 2008 cycle. The upper tidal freshwater segment exceeds both the spring and summer seasonal means.

Farrar Gut was mistakenly combined with the mainstem in previous assessments. The stream is a separate waterbody and should not be included in the chlorophyll a impairment, which only includes the mainstem James River.

IMPAIRMENT SOURCE: Point sources, Nonpoint Sources

The James River Tributary Strategy was developed to bring the river into attainment.

RECOMMENDATION: Problem Characterization

2010 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **James River and Various Tributaries**

TMDL ID: **G01E-03-PCB** **2010 IMPAIRED AREA ID:** CB-JMSTFU

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2014

IMPAIRED SIZE: ~325 - Stream mile **Watershed:** VAP-G01E

INITIAL LISTING: 2002

UPSTREAM LIMIT: Fall line

DOWNSTREAM LIMIT: Hampton Roads Bridge Tunnel

Estuarine James River from the fall line to the Hampton Roads Bridge Tunnel, including several tributaries listed below.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Fish Consumption Use - Not Supporting

IMPAIRMENT: Fish Tissue - PCBs, VDH Fish Consumption Restriction

During the 2002 cycle, the James River from the Fall line to Queens Creek was considered not supporting of the Fish Consumption Use due to PCBs in multiple fish species at multiple DEQ monitoring locations.

During the 2004 cycle, a VDH Fish Consumption Restriction was issued from the fall line to Flowerdew Hundred and the segment was adjusted slightly to match the Restriction. In addition, in the 2004 cycle, the Chickahominy River from Walkers Dam to Diascund Creek was assessed as not supporting the Fish Consumption Use because the DEQ screening value for PCBs was exceeded in 3 species during sampling in 2001.

During the 2006 cycle, the VDH restriction was extended on 12/13/2004 to extend from the I-95 bridge downstream to the Hampton Roads Bridge Tunnel and include the tidal portions of the following tributaries:

Appomattox River up to Lake Chesdin Dam
Bailey Creek up to Route 630
Bailey Bay
Chickahominy River up to Walkers Dam
Skiffes Creek up to Skiffes Creek Dam
Pagan River and its tributary Jones Creek
Chuckatuck Creek
Nansemond River and its tributaries Bennett Creek and Star Creek
Hampton River
Willoughby Bay and the Elizabeth R. system (Western, Eastern, and Southern Branches and Lafayette R.) and tributaries St. Julian Creek, Deep Creek, and Broad Creek

The advisory was modified again on 10/10/2006 to add Poythress Run.

The impairments were combined. The TMDL for the lower extended portion is due in 2018.

Farrar Gut was mistakenly combined with the mainstem in previous assessments. The stream is a separate waterbody and is not included in the VDH Fish Consumption Advisory.

IMPAIRMENT SOURCE: Unknown

The source of the PCBs is considered unknown.

Attachment D

Site Inspection Report

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Piedmont Regional Office

WASTEWATER FACILITY INSPECTION REPORT

FACILITY NAME:	Kinder Morgan Operating LPA	**INSPECTOR:**	Charles Stitzer
PERMIT No.:	VA0086151	**INSPECTION DATE:**	July 9, 2009
TYPE OF FACILITY:	Industrial -Minor	**REPORT COMPLETED:**	July 21, 2009
COUNTY/~~CITY~~:	Henrico County	**UNANNOUNCED INSPECTION:**	NO
REVIEWED BY:			
PRESENT DURING INSPECTION:	Mike Dare, Jerry Welch, Patrick Davis		

I. OPERATIONAL UNIT REVIEW AND CONDITION:

Kinder Morgan's 3302 Deepwater Terminal Road site is a "Transmix" and bulk petroleum storage facility. The facility is manned 24 hours/day 7 days/week. The site is secured by a chain link fence and an extensive remote camera monitoring system.

As well as providing bulk storage of petroleum, there is a distillation refinery on site which is designed to separate different petroleum products that have become mixed at their interface in the delivery pipelines (Colonial Pipeline and Plantation Pipeline). The mixed products are drawn off from the pipelines, heated in the distillery and fractionated into their individual components. A small amount of contaminated water (through contact w/ benzene) is produced in the process. This water is drawn off and handled as hazardous waste.

Storm water runs off from three distinct areas at this facility: the tank farm, the refinery process pad and the loading rack. The runoff all combines in the in-ground oil/water separator, the discharge of which is designated Outfall 002.

The tank farm is contained within an earthen dike. The dike was in very good condition and the containment area was clean and free of debris or evidence of any oil spillage or staining. Rainwater accumulates at the low end of the containment area, forming a retention basin. The discharge valve from this area is manually opened to release the water to the oil/water separator. The water contained in this area at the time of the inspection was clear with no oil sheen.

The refinery is located over a curbed concrete pad in the northeast corner of the property. The entire refinery area is enclosed w/in a concrete walled containment area. Bulk chemical totes and other drummed material are stored in this area. The refinery area was very clean and there was no evidence of previous spills or leaks. Rainwater runoff from this area drains to the main oil/water separator via drop inlets.

The loading rack, located in the southwest corner of the property is on a curbed concrete pad which drains to a small oil/water separator and from there to the settlement basin within the diked tank farm. The paved parking area also drains to the diked containment. Although this area is a small portion of the overall operation, it is the area where there is the most potential for chronic storm water runoff contamination.

The in-ground oil/water separator is located within a deep swale at the eastern edge of the paved lot. The discharge from the oi/water separator is designated as point source 002.The oil/water separator was not discharging at the time of the inspection.

II. ULTIMATE DISPOSAL OF SOLIDS:

Pump and haul from the oil/water separator.

III. FIELD DATA: No discharge at the time of the inspection

Flow:	Not meas. MGD	**Dissolved Oxygen:**	___mg/L	**Contact Chlorine Res.:**	_____mg/L
pH:	__S.U.	**Final Chlorine Res.:**	___ mg/L	**Temperature:**	_____ EC

Calibration Time/Initials/documentation:

Condition of Effluent: No discharge

Condition of Receiving Stream: The o/w separator discharges to a dry ditch.

Samples Collected during the inspection: N/A

IV. PLANT OPERATIONS AND MAINTENANCE:

Operations and Maintenance Manual: Approved August 2, 2001

Class and Number of Licensed Operators: N/A

Alarm Systems and Alternate Power: N/A

Any bypassing since last inspection? No

When was the RPZ device last checked? N/A

Name, number and description of pump stations: N/A

V. COMMENTS:

Items evaluated during this inspection include (check all that apply):

[X] Yes	[ ] No		Operational Units
[ ] Yes	[X] No		O & M Manual
[ ] Yes	[X] No		Maintenance Records
[ ] Yes	[ ] No	[X] N/A	Pathogen Reduction & Vector Attraction Reduction
[ ] Yes	[ ] No	[X] N/A	Sludge Disposal Plan
[ ] Yes	[ ] No	[X] N/A	Groundwater Monitoring Plan
[ ] Yes	[ ] No	[X] N/A	Storm Water Pollution Prevention Plan
[X] Yes	[ ] No	[ ] N/A	Permit Special Conditions
[ ] Yes	[X] No	[ ] N/A	Permit Water Quality Chemical Monitoring
[X] Yes	[ ] No	[ ] N/A	Laboratory Records (see Lab Report)

VI. GENERAL RECOMMENDATIONS:

Although the loading rack is curbed and contaminated runoff from the area is drained through oil water separators, it still represents the most potential for chronic oil contamination of storm water runoff. Oil spotting and staining in this area indicate that minor spills and drips are occurring during loading operations.

1. Monitor oil spotting in this area to determine if minor spills and drips are increasing or becoming problematic.
2. To reduce drips and leaks during petroleum transfer, periodically inspect the oil transfer equipment (lines, gaskets, couplings, etc) and replace or repair as appropriate.
3. Place spill kits and fire proof rag buckets at the racks and instruct the drivers to use them.
4. Post signs stressing the importance of clean transfer practices and alerting of the need to clean up the smallest spills and drips.

VII. COMPLIANCE RECOMMENDATIONS/REQUEST FOR CORRECTIVE ACTION:

There are no Compliance Recommendations at this time.

VIII. PHOTOGRAPHS:

Oil/water separator basin

In ground oil/water separator w/in basin

Refinery

Chemical totes stored in Refinery area

Drums stored in refinery area (note containment wall in background)

Minor oil staining in loading area

Attachment E

WET Information

Kazio, Jeremy (DEQ)

From: Kazio, Jeremy (DEQ)
Sent: Friday, March 18, 2011 11:31 AM
To: DeBiasi, Deborah (DEQ)
Subject: WET Concurrence - Kinder Morgan Operating LP"A" (VA0086151)

Hi Deborah,

Your concurrence on the subject facility's WET testing requirements is needed ☺.

Facility Info:

The facility serves as a bulk petroleum product storage and distribution center. In addition, separation of pipeline Transmix using an atmospheric distillation process is conducted onsite, though there's no wastewater derived from this process. Wastewater discharged from a single outfall, Outfall 002, originates from storm water collected within the AST containment berm, loading racks, and Transmix process pad. The wastewater (storm water) is treated via an oil/water separator prior to being released directly to the James River. There is a diffuser at the discharge point, however, it is not accounted for by any water modeling. As is the case for most bulk petroleum storage facilities, the permittee actually discharges on an intermittent basis depending on precipitation amounts and testing of collected water prior to release. For the purposes of reporting and permit evaluations, however, discharge volumes are reported and calculated as daily flow rates. The 2006 permit writer used a flow of 0.050 MGD based on the 30-day maximum flow reported during the previous 5 years. In Feb.2010, the permittee submitted a DMR which reported a 30-day average flow of 0.73 MGD, which represents the maximum reported 30-day average flow since the 2006 permit was reissued. I'm obligated to use this flow for the purposes of water quality evaluations despite their typical reported 30-day average of ~0.020 - 0.050 MGD.

I know that we don't typically do this, but instead of giving you a rundown of information that I think you'd be interested in seeing, I've attached a copy of the draft fact sheet to this email. Since WET testing is the very last thing that needs to be addressed prior to beginning the QA process, the draft fact sheet provides almost all of the information you'd probably be interested in, especially the data contained in the attachments (Form 2C , DMR, and Attachment A results). The portions highlighted yellow still need to be addressed.

Despite the evaluation of multiple data due mainly to inadequate QL's reported for Attachment A, the only toxic parameter to cause a limit is TRC due to a reported concentration of 1.3 mg/L. Although I've placed a new limitation for TRC into the draft permit, I've asked the permittee to provide additional TRC data since both the permittee's consultant and I are perplexed as to why it would be showing up in their effluent. Something that should be noted is that TRC was the only reported parameter which was measured in the field rather than tested in the lab for the 2011 application. I'm going to continue with the permitting process, but in the meantime I told the permittee that I'd accept additional TRC data up until the draft is ready for public notice. If the data that they submit ends up eliminating the need for the limit, I'm planning to take it out with additional notation in the fact sheet.

WET Monitoring

The WET monitoring requirements included in the 2006 permit consisted of annual acute monitoring for *Ceriodaphnia dubia* with an LC50 endpoint of >=13% (TUa <=7.69). For some reason, the previous permit writer did not enter the WET monitoring schedule into CEDS, so the submission of TMP reports from this facility were not tracked adequately even though the permit writer conducted the WET Checklist evaluations on the reports we did receive. I've dug through all hard and soft copy records for this facility, and could only come up with the TMP reports due for 2006, 2008, and 2010. The results are:

May 8, 2006 – LC50>100%, TUa<1.0

January 2, 2009 – LC50=67%, TUa=1.5

May 24, 2010 – LC50>100%, TUa<1.0

For the 2011 permit reissuance, the change in effluent/receiving stream flows have resulted in a more stringent acute WET endpoint of **LC50>=24% (TUa<=4.16)** and a more stringent **WLAa of 4.19**. Running what limited data we have through STATS indicated that a limitation is not needed. To be conservative, I changed the TUa's that were <1.0 to 1.0 and used a false QL of 0.1. The resulting daily 97th percentile value (2.84) was still far below the WLAa calculated by WETLIM (4.19).

If you want to see the WETLIM spreadsheet, let me know and I'll send it right away. Otherwise, below are the inputs I used:

Plant flow: 0.73 MGD
1Q10 Flow: 445 MGD
7Q10 Flow: 500 MGD
MIX 1Q10: 2.13%
MIX 7Q10: 100%
No CV or ACR Data Available
No diffuser/model study

The results produced by WETLIM are:

ICWa: 7.15%
Calculated TUa Endpoint: 4.19527408
Calculated TUa Converted to LC50: 24%
LC50 converted back to TUa and rounded up: 4.16

The STATS results are copied below:

Facility = Kinder Morgan Operating LP"A"
Chemical = Acute WET - C.dubia (48-hour Static)
Chronic averaging period = 4
WLAa = 4.19
WLAc =
Q.L. = .1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 1.16666
Variance = .49
C.V. = 0.6
97th percentile daily values = 2.83898
97th percentile 4 day average = 1.94108
97th percentile 30 day average= 1.40706
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1
1.5
1

Below is the WET monitoring special condition included in the 2006 Permit. I've left the old endpoints just to show you how the special condition was written. Can you please revise the language in your reply to include any edits or additional language that you'd like to see placed into the permit. Please let me know if you have any questions or concerns, or if you'd like to see any additional information. Thanks so much Deborah!!!!

C. Whole Effluent Toxicity (WET) Testing

1. Biological Monitoring

a. In accordance with the schedule in Part I.C.2 below, the permittee shall conduct acute toxicity tests annually for the duration of the permit. The permittee shall collect a time- proportioned composite sample of final effluent from outfall 002 which consists of grab samples taken over the duration of the discharge event.

(1) The acute tests to use are:
48 Hour Static Acute test using *Ceriodaphnia dubia.*

(2) These acute tests shall be performed with a minimum of 5 dilutions, derived geometrically, for calculation of a valid LC_{50}. Express the results as TU_a (Acute Toxic Units) by dividing $100/LC_{50}$ for DMR reporting.

(3) The permittee may provide additional samples to address data variability; these data shall be reported and may be included in the evaluation of effluent toxicity. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3

b. The following criteria shall be used in evaluating the toxicity test data generated in Part I.C.1.a above:

Outfall 002
Acute LC_{50} of ≥13% equivalent to a TU_a of ≤7.69

c. The test data will be evaluated for reasonable potential at the conclusion of the permit term. The data may be evaluated sooner if toxicity has been noted. Should evaluation of the data indicate that a limit is needed, a WET limit and compliance schedule will be required and the toxicity tests in Part I C.1.a. may be discontinued.

2. Reporting Schedule

The permittee shall submit reports with the DMR of the toxicity test report for the tests specified in accordance with the following schedule:

Period	Compliance Date	Submittal Date
Annual 1	By 12/31/2006	By 01/10/2007
Annual 2	By 12/31/2007	By 01/10/2008
Annual 3	By 12/31/2008	By 01/10/2009
Annual 4	By 12/31/2009	By 01/10/2010
Annual 5	By 12/31/2010	By 01/10/2011

Kazio, Jeremy (DEQ)

From: DeBiasi, Deborah (DEQ)
Sent: Monday, April 11, 2011 1:43 PM
To: Kazio, Jeremy (DEQ)
Subject: RE: Forgot attachment
Attachments: KinderMorgan VA0086151-edit.docx

Fixed it (hopefully!). See what you think

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: Deborah.DeBiasi@deq.virginia.gov
PH: 804-698-4028

From: Kazio, Jeremy (DEQ)
Sent: Monday, April 11, 2011 12:29 PM
To: DeBiasi, Deborah (DEQ)
Subject: RE: Forgot attachment

Hi Deborah,

The WET language that you provided to me is for discharges of storm water. Although the wastewater discharged from this facility originates from storm water, it is not permitted *as* storm water due to the fact that it is collected and held within the containment berm, then manually release via a gate valve through an oil/water separator. Additionally, the facility's SIC code places it into Sector P of the storm water requirements, which excludes bulk petroleum sites unless they have vehicle maintenance onsite, which this particular permittee does not.

I hate to keep bothering you about this facility, do you want me to go ahead and use the TMP Language Templatespreadsheet that you developed instead?

Sorry again. Thanks.

Jeremy S. Kazio
Water Permit Writer
DEQ Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060
Tel: (804) 527-5044

VPDES Program | Applications & Fees

CTC's/CTO's | Do you need a permit?

From: DeBiasi, Deborah (DEQ)
Sent: Friday, April 01, 2011 2:05 PM
To: Kazio, Jeremy (DEQ)
Subject: RE: Forgot attachment

Your flows and endpoints were good, and everything was described very well in the fact sheet. Probably the only thing I don't have a ready answer to is when did the Pimephales promelas testing stop. I suspect it wasn't as sensitive as the the C. dubia, but I always like to see something that indicated it was tested and dropped, versus never tested.

I've attached some WET language for you to play with. Let me know if you have any questions. Sorry it took so long to get back to you but am having to spend a lot of time on this DEA national drug collection effort.

Deborah

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: Deborah.DeBiasi@deq.virginia.gov
PH: 804-698-4028

From: Kazio, Jeremy (DEQ)
Sent: Tuesday, March 29, 2011 11:04 AM
To: DeBiasi, Deborah (DEQ)
Subject: RE: Forgot attachment

Our planning department normally provides ambient stream flows to permit writers for use in permit limitation development. The Flow Frequency Memo included the recommendation to use tidal defaults, but also provided freshwater flows, essentially leaving it up to the permit writer to decide which is more appropriate. I spoke with both Curt and Jennifer Palmore about this, and we determined that it would be best to remain consistent with several larger dischargers in the same area and use the freshwater flows instead. My fact sheet contains the following statement at the top of Page 2 which explains why I used freshwater flows:

> ** - The permittee's discharge point is located 3.72 miles downstream of the James River fall line. Tidal influence, although present, is very minimal and does represent typical yearlong flow scenarios at this location. For the purposes of the 2011 permit reissuance, flow frequencies derived for the James River fall line have been utilized for receiving stream pollutant evaluations.

With regard to the TRC limit removal, the permittee claims that they spoke with HACH about possible interferences with the DPD method they used (HACH 8167), and that HACH replied by saying that moisture or water droplets on the sample ampule or in the colorimeter/spectrophotometer may cause light diffraction which could lead to false readings. The permittee offered this as a reason to drop the original data point, and even provided the field notes from the sample day showing that it was raining. In my STATS evaluation, I kept the original data point and added the new data. STATS indicated that no limit was needed even with the original data. Here is my fact sheet write-up for that too.

> ‡ - Please note: The 2011 permit was originally drafted with a Total Residual Chlorine limitation due to a single data point of 1.3 mg/L reported with the application. The permittee submitted 5 new data points on 3/25/2011 representing samples taken on 3/21/2011. The samples were tested in the field using HACH DPD Method 8167 for Total Residual Chlorine, which has a detection range of 0.02 mg/L – 2.0 mg/L. A Reasonable Potential Analysis utilizing the new data indicates that a limitation for TRC is not required. Please see **Attachment G** for the STATS evaluation, which includes a description of how the new TRC data were evaluated. The TRC limit and all associated permit special conditions, compliance schedule, and other document references (EPA checklist, public notice, NPDES permit rating worksheet, etc.) were subsequently removed on 3/28/2011 from the 2011 permit.

From: DeBiasi, Deborah (DEQ)
Sent: Tuesday, March 29, 2011 10:40 AM
To: Kazio, Jeremy (DEQ)
Subject: RE: Forgot attachment

Quick question that may even be answered in your documentation somewhere. You mention it is tidal, which might imply the default mixes of 2:1 and 50:1. The fact sheet uses their reported flow, and a percentage of the acute 1Q10 in the calculations. Is there justification for using the flows versus defaults? Actual data is always preferable to defaults.

As for the CL, I was wondering if it was a residual from a cleaner used somewhere, or a false positive from bromine, or one of these other compounds.

I'm finishing up something right now, then will get back to your permit shortly.

1. **Positive Chlorine** Test after polishing D.I. & UV - Topic
   6 posts - 4 authors - Last post: Mar 3, 2000
   Some of the so called **chlorine** stabilizers (cyanuric acid) will give a **false positive** for total **chlorine**. However, I can't imagine how these **...**
   renalweb.groupee.net/eve/forums/a/tpc/f/.../9331024023 - Cached - Similar
   Get more discussion results

2. **[PDF]**

   Standard Operating Procedures for Analysis of Total **Chlorinated ...**
   File Format: PDF/Adobe Acrobat - Quick View
   free **chlorine** in the tap water could (theoretically) indicate a low-level **false positive** in the soil sample. The potential for producing a false **...**
   www.epa.gov/superfund/programs/dfa/download/colortec_sop.pdf - Similar

3. **False Positive** Ammonia Results? Need Test Kit Advice
   9 posts - 3 authors - Last post: Oct 8, 2008
   a tropical fresh-water site covering all aspects of the hobby, from the fish to the aquariums. It contains sections for the novice and more **...**
   www.badmanstropicalfish.com › ... › Beginner's Circle - Cached - Similar
   Get more discussion results

4. Measuring **Chlorine**
   Oxidized manganese is known to cause a **false positive for chlorine** when using the DPD indicator. Another drawback to this method, specifically for public **...**
   www.wqpmag.com/Measuring-**Chlorine**-article8310 - Cached - Similar
5. Hach - Knowledge Base - **False positive chlorine** results using DPD
   Other oxidants such as bromine, iodine, ozone, **chlorine** dioxide, or hydrogen peroxide can react with DPD and cause **false positives**. **...**
   www.hach.com/...**CHLORINE**.../NewLinkLabel=**False**+**positive**+**chlorine**+results+using+DPD - Cached
6. Total Residual **Chlorine** -2

... oxidizing agents can produce a **positive** interference in these methods. **...** A **false** residual **chlorine** reading in an industrial waste sample may lead to **...**
www.lagoonsonline.com/.../total-**chlorine**-residual-2.htm - Cached - Similar

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: Deborah.DeBiasi@deq.virginia.gov
PH: 804-698-4028

From: Kazio, Jeremy (DEQ)
Sent: Tuesday, March 29, 2011 10:31 AM
To: DeBiasi, Deborah (DEQ)
Subject: RE: Forgot attachment

Deborah,

Just in case this has a bearing on your WET concurrence for this facility, the new TRC limitation has been removed due to the permittee providing several new data points that were significantly lower than the original submitted with the application. The permittee is claiming equipment and user error based on their correspondence with HACH. I've run the new data with the original data point in STATS and it indicated that no limit is needed.

Please let me know if you have any questions. I can resend the fact sheet when I'm done if that helps you at all.

From: DeBiasi, Deborah (DEQ)
Sent: Monday, March 28, 2011 9:03 AM
To: Kazio, Jeremy (DEQ)
Subject: RE: Forgot attachment

I'm going to work on your stuff today, fyi.

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: Deborah.DeBiasi@deq.virginia.gov
PH: 804-698-4028

From: Kazio, Jeremy (DEQ)
Sent: Wednesday, March 23, 2011 1:06 PM
To: DeBiasi, Deborah (DEQ)
Subject: RE: Forgot attachment

Deborah,

Just wondering if you've had a chance to review this information yet. Not trying to hurry you, just wondering.

Thanks!!!

From: DeBiasi, Deborah (DEQ)
Sent: Friday, March 18, 2011 12:10 PM
To: Kazio, Jeremy (DEQ)
Subject: RE: Forgot attachment

Will do! It'll be next week before I can get to this. Thanks for all the info – it's helpful!

Deborah L. DeBiasi, Virginia DEQ
Office of Water Permit and Compliance Assistance Programs
Email: Deborah.DeBiasi@deq.virginia.gov
PH: 804-698-4028

From: Kazio, Jeremy (DEQ)
Sent: Friday, March 18, 2011 11:41 AM
To: DeBiasi, Deborah (DEQ)
Subject: Forgot attachment

Sorry, I forgot to attach the draft fact sheet as promised.

Certain parts addressing nutrients, chlorophyll-a, and TSS might not make a lot of sense, but there are reasons for that. Also, I try to make my attachments hold as much information as possible within a single page, so you may have to zoom in in order to see the data. Since we're sending electronic copies of these documents out to our permittees now, it has been easier to compact the attachments down knowing that they can still be read clearly by simply zooming in.

Let me know if you have any questions, thanks.

A. WET special condition for Monitoring

1. Within 3 months of issuance/effective date of the permit, the permittee shall perform annual toxicity testing on Outfall 002 using a time proportional composite sample collected during a ~~stormwater~~ discharge event (see A.3. for details) for the duration of the permit. The acute test to use is:

48 Hour Static Acute Test with *Ceriodaphnia dubia*

These acute tests shall be performed with a minimum of 5 dilutions , derived geometrically, for calculation of a valid LC50. Express as the results as TUa (Acute Toxic Units) by dividing 100/LC50 for DMR reporting.

2. The test dilutions should be able to determine compliance with the following endpoint(s):

Acute LC_{50} of 24% equivalent to a TU_a of 4.16

The permittee may provide additional samples to address data variability. These data shall be reported and may be included in the evaluation of effluent toxicity. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3

3. Sampling of stormwater outfall 002 shall~~, if at all possible, be initiated within the first three hours following the initiation of a rainwater discharge event. If this action can not be accomplished as required, the sample(s) shall be taken as soon as possible, but not later than 24 hours after the rainwater discharge commences. Composite~~ be from hourly grabs collected for the duration of the discharge, not to exceed 24 hours. The permittee shall submit the following information with the results of the toxicity tests:

- Volume of each grab sample collected
- Number of grab samples collected to make the composite sample
- Duration of discharge - start and end date(s) and times.

~~An actual measurement or estimate of the effluent flow at the time of sampling.~~

~~The time the storm event began, the time the effluent was sampled, and the duration of the storm event.~~

~~The duration between the storm event sampled and the end of the previous storm event."~~

4. The test data will be evaluated by STATS.EXE for reasonable potential at the conclusion of the test period. The data may be evaluated sooner if requested by the permittee, or if toxicity has been noted. Should evaluation of the data indicate that a limit is needed, a

WET limit and compliance schedule will be required and the toxicity tests of A.1. may be discontinued.

5. The permit may be modified or revoked and reissued to include pollutant specific limits in lieu of a WET limit should it be demonstrated that toxicity is due to specific parameters. The pollutant specific limits must control the toxicity of the effluent.

6. Testing and reporting schedule. The permittee shall report the results on the DMR and submit a copy of each toxicity test report in accordance with the following schedule:

"Annual Test Period	Test Period Dates	Submit Test Report with DMR
An 1	Jan 1 – Dec 31, 20XX	Jan 10, 20XX
An 2	Jan 1 – Dec 31, 20XX	Jan 10, 20XX
An 3	Jan 1 – Dec 31, 20XX	Jan 10, 20XX
An 4	Jan 1 – Dec 31, 20XX	Jan 10, 20XX
An 5	Jan 1 – Dec 31, 20XX	Jan 10, 20XX"

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Enter data in the cells with blue type:

Entry Date:	10/07/11
Facility Name:	Kinder Morgan
VPDES Number:	VA0086151
Outfall Number:	002

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE	3.408328851	TUa	LC_{50} =	30	% Use as	3.33	TUa

ACUTE WLAa 3.40832877

Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.0 a limit may result using WLA.EXE

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	34.08328851	TU_c	NOEC =	3	% Use as	33.33	TU_c
BOTH*	34.08328851	TU_c	NOEC =	3	% Use as	33.33	TU_c
AML	34.08328851	TU_c	NOEC =	3	% Use as	33.33	TU_c

ACUTE WLAa,c 34.0832877
CHRONIC WLAc 621.547945
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 14.0063458 a limit may result using WLA.EXE

% Flow to be used from MIX.EXE

Plant Flow:	0.73 MGD	
Acute 1Q10:	396 MGD	1.91 %
Chronic 7Q10:	453 MGD	100 %

Difuser /modeling study?

Enter Y/N	N	
Acute	1	:1
Chronic	1	:1

Are data available to calculate CV? (Y/N) N (Minimum of 10 data points, same species, needed) Go to Page 2
Are data available to calculate ACR? (Y/N) N (NOEC<LC50, do not use greater/less than data) Go to Page 3

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

IWC_a	8.801967782	%	Plant flow/plant flow + 1Q10
IWC_c	0.160888634	%	Plant flow/plant flow + 7Q10
Dilution, acute	11.36109589		100/IWCa
Dilution, chronic	621.5479452		100/IWCc
WLA_a	3.408328767		Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	621.5479452		Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	34.08328767		ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10		LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6		Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447		Default = 0.41
eB	0.6010373		Default = 0.60
eC	2.4334175		Default = 2.43
eD	2.4334175		Default = 2.43 (1 samp) No. of samples: 1

**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.

$LTA_{a,c}$	14.00634643	WLAa,c X's eA						
LTA_c	373.5734988	WLAc X's eB					Rounded NOEC's	%
MDL** with $LTA_{a,c}$	34.08328851	TU_c	NOEC =	2.933989	(Protects from acute/chronic toxicity)		NOEC = 3	%
MDL** with LTA_c	909.0602895	TU_c	NOEC =	0.110004	(Protects from chronic toxicity)		NOEC = 1	%
AML with lowest LTA	34.08328851	TU_c	NOEC =	2.933989	Lowest LTA X's eD		NOEC = 3	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

						Rounded LC50's	%
MDL with $LTA_{a,c}$	3.408328851	TU_a	LC50 =	29.339892	%	LC50 = 30	%
MDL with LTA_c	90.90602895	TU_a	LC50 =	1.100037	%	LC50 = 2	

Acute WET-C.dubia (48-hour static)

10/7/2011 8:54:32 AM

Facility = Kinder Morgan Operating LP"A"
Chemical = Acute WET - C.dubia (48-hour Static)
Chronic averaging period = 4
WLAa = 3.33
WLAc =
Q.L. = 0.1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 1.16666
Variance = .49
C.V. = 0.6
97th percentile daily values = 2.83898
97th percentile 4 day average = 1.94108
97th percentile 30 day average= 1.40706
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1
1.5
1

Attachment F

DMR Data & Summary of Testing Results for Attachment A and Form 2 C

DMR Data: Outfall 002 (June 2006 - February 2011)

Kinder Morgan Transmix Co., LLC: VA0086151

DMR Due Date	Flow (MGD)		pH (SU)	Total Organic Carbon (mg/L)	Total Petroleum Hydrocarbons (mg/L)
	Monthly Average	Maximum			
2006-2011 Limit →	**NL**	**NL**	**6.0-9.0 SU**	**110.0 mg/L**	**15 mg/L**
6/10/2006	0.0449625	0.0495	7.41	4.9	
7/10/2006	0.029493	0.0465	7.81	4.8	
8/10/2006	0.02475	0.0363	7.3	5.2	<0.1
9/10/2006	0.053625	0.073425	7.9	6.8	
10/10/2006	0.03366	0.0792	7.01	3.5	
11/10/2006	0.054945	0.0792	7.8	1.9	<1.1
12/10/2006	0.041023	0.792	7.2	7.3	
1/10/2007	0.02145	0.047025	7.6	1.85	
2/10/2007	0.02541	0.0363	7.42	2.2	<1
3/10/2007	0.029535	0.05115	7.2	<1	
4/10/2007	0.030113	0.0495	7.42	6.1	
5/10/2007	0.022825	0.060225	7.9	2.6	<1.1
6/10/2007	0.053328	0.058575	6.8	11.6	
7/10/2007	0.0264	0.0693	7.9	4.69	
8/10/2007	0.02981	0.04785	7.19	2.4	<1.1
9/10/2007	0.02268	0.0429	6.8	26	
10/10/2007	0.03465	0.0363	7.38	4.1	
11/10/2007	0.034414	0.0792	7.6	24	3.6
12/10/2007	0.0396	0.05445	7.45	52	
1/10/2008	0.04455	0.0495	7.82	3.6	
2/10/2008	0.02846	0.03795	7.66	45	21.5
3/10/2008	0.06311	0.0792	7.61	1.8	
4/10/2008	0.03135	0.05115	7.66	1.7	
5/10/2008	0.05628	0.0864	7.18	9.7	<1.1
6/10/2008	0.0954	0.504	7.65	2.1	
7/10/2008	0.0258	0.0288	7.6	<QL	
8/10/2008	0.03672	0.0486	7.7	4.9	1.1
9/10/2008	0.0034	0.0612	7.78	2.5	
10/10/2008	0.0265	0.0864	7.41	1.48	
11/10/2008					
12/10/2008	0.004	0.063	8.13	1.36	0.16
1/10/2009	0.011	0.086	7.35	<1	
2/10/2009	0.002	0.0612	8.48	2.28	0.66
3/10/2009	0.0028	0.0512	8.3	2.95	
4/10/2009	0.012	0.086	8.16	8.06	
5/10/2009	0.0028	0.0462	7.56	4.86	1.3
6/10/2009	0.0034	0.072	6.98	2.53	
7/10/2009	0.011	0.086	8.06	1.64	
8/10/2009	0.008	0.086	7.85	4.24	0.95
9/10/2009	0.001	0.045	6.12	3.52	
10/10/2009	0.008	0.083	8.22	3.2	
11/10/2009	0.003	0.036	7.68	4.1	0.7
12/10/2009	0.024	0.086	7.92	1.5	
1/10/2010	0.014	0.086	7.84	1.1	
2/10/2010	0.006	0.086	7.32	1.5	<0.5
3/10/2010	0.008	0.086	7.95	<1	
4/10/2010	0.009	0.086	7.41	1.6	
5/10/2010	0.36	0.86	6.46	4.1	<1.1
6/10/2010	0.36	0.86	9	4.4	
7/10/2010	0.01	0.86	6.02	5.5	
8/10/2010					
9/10/2010	0.288	0.864	6.68	3	
10/10/2010					
11/10/2010	0.73	0.846	6.17	1.6	<1.0
12/10/2010	0.027	0.054	7.7	1.9	
1/10/2011	0.071	0.0864	7.46	1.6	
2/10/2011	0.069	0.0864	7.85	1.7	<1.0
Maximum	**0.730**	**0.864**	**9.000**	**52.000**	**21.500**
Average	**0.058**	**0.159**	**7.515**	**6.259**	**3.746**
90th Percentile	**0.070**	**0.706**	**8.109**	**9.890**	**8.970**
10th Percentile	**0.003**	**0.039**	**6.800**	**1.590**	**0.510**

	= Values used in MSTRANTI spreadsheet for development of facility Wasteload Allocations (WLA's)
	= Value does not comply with 2006 permit limitation

Kinder Morgan Transmix Co., LLC (VA0086151): Outfall 002 Summary of Attachment A Test Results

2012 Permit Reissuance

METALS								
CASRN#	CHEMICAL	EPA ANALYSIS		QUANTIFICATION LEVEL (µg/L)		REPORTING RESULTS (µg/L)		REQUIRED SAMPLE TYPE
		Required	Used	Recommended	Used	Grab	Composite	
7440-36-0	Antimony, dissolved	--	200.9	1.4	5	<5		G or C
7440-38-2	Arsenic, dissolved	--	200.9	1.0	5	<5		G or C
7440-39-3	Barium	--	200.7	200.00	10	16.3		G or C
7440-43-9	Cadmium, dissolved	--	200.9	0.30	0.3	<0.3		G or C
16065-83-1	Chromium III, dissolved	--	200.7	3.60	10	<10		G or C
18540-29-9	Chromium VI, dissolved	--	3500CrD	1.60	5	<5		G or C
7440-50-8	Copper, dissolved	--	200.9	0.50	3	8.6		G or C
7439-89-6	Iron	--	200.7	--	10	139.1		G or C
7439-92-1	Lead, dissolved	--	200.9	0.50	2	<2		G or C
7439-96-5	Manganese	--	200.7	--	10	<10		G or C
7439-97-6	Mercury, dissolved	--	245.1	1.0	0.2	<0.2		G or C
7440-02-0	Nickel, dissolved	--	200.9	0.94	3	<3		G or C
7782-49-2	Selenium, Total Recoverable	--	200.9	2.0	3	<3		G or C
7782-49-2	Selenium, dissolved	--						
7440-22-4	Silver, dissolved	--	200.9	0.20	0.5	<0.5		G or C
7440-28-0	Thallium, dissolved	--	200.9	--	2	<2		G or C
7440-66-6	Zinc, dissolved	--	200.7	2.0	10	43.8		G or C

PESTICIDES/PCB'S								
CASRN#	CHEMICAL	EPA ANALYSIS		QUANTIFICATION LEVEL (µg/L)		REPORTING RESULTS (µg/L)		REQUIRED SAMPLE TYPE
		Required	Used	Recommended	Used	Grab	Composite	
309-00-2	Aldrin	608	608	0.05	0.005	<0.005		G or C
57-74-9	Chlordane	608	608	0.2	0.2	<0.2		G or C
2921-88-2	Chlorpyrifos (synonym = Dursban)	--	8141A	--	0.39	<0.39		G or C
72-54-8	DDD	608	608	0.1	0.1	<0.1		G or C
72-55-9	DDE	608	608	0.1	0.04	<0.04		G or C
50-29-3	DDT	608	608	0.1	0.25	<0.25		G or C
8065-48-3	Demeton	--	8141A	--	0.54	<0.54		G or C
333-41-5	Diazinon	--	8141A	--	0.39	<0.39		G or C
60-57-1	Dieldrin	608	608	0.1	0.005	<0.005		G or C
959-98-8	Alpha-Endosulfan	608	608	0.1	0.1	<0.1		G or C
33213-65-9	Beta-Endosulfan	608	608	0.1	0.04	<0.04		G or C
1031-07-8	Endosulfan Sulfate	608	608	0.1	0.01	<0.01		G or C
72-20-8	Endrin	608	608	0.1	0.1	<0.1		G or C
7421-93-4	Endrin Aldehyde	--	608	--	0.2	<0.2		G or C
86-50-0	Guthion	--	8141A	--	1.2	<1.2		G or C
76-44-8	Heptachlor	608	608	0.05	0.05	<0.05		G or C
1024-57-3	Heptachlor Epoxide	--	608	--	0.2	<0.2		G or C
319-84-6	Hexachlorocyclohexane Alpha-BHC	608	608	--	0.02	<0.02		G or C
319-85-7	Hexachlorocyclohexane Beta-BHC	608	608	--	0.05	<0.05		G or C
58-89-9	Hexachlorocyclohexane Gamma-BHC or Lindane	608	608	--	0.02	<0.02		G or C
143-50-0	Kepone	8270D	8270D	--	5	<5		G or C
121-75-5	Malathion	--	8141A	--	0.33	<0.33		G or C
72-43-5	Methoxychlor	--	608	--	2	<2		G or C
2385-85-5	Mirex	--	8081A	--	0.1	<0.1		G or C
56-38-2	Parathion	--	8141A	--	0.29	<0.29		G or C
11096-82-5	PCB 1260	608	608	1.0	1.0	<1		G or C
11097-69-1	PCB 1254	608	608	1.0	1.0	<1		G or C
12672-29-6	PCB 1248	608	608	1.0	1.0	<1		G or C
53469-21-9	PCB 1242	608	608	1.0	1.0	<1		G or C
11141-16-5	PCB 1232	608	608	1.0	1.0	<1		G or C
11104-28-2	PCB 1221	608	608	1.0	1.0	<1		G or C
12674-11-2	PCB 1016	608	608	1.0	1.0	<1		G or C
1336-36-3	PCB Total	608	608	7.0	7.0	<7		G or C
8001-35-2	Toxaphene	608	608	5.0	3.0	<3		G or C

Kinder Morgan Transmix Co., LLC (VA0086151): Outfall 002 Summary of Attachment A Test Results
2012 Permit Reissuance

BASE NEUTRAL EXTRACTABLES								
CASRN#	CHEMICAL	EPA ANALYSIS		QUANTIFICATION LEVEL (µg/L)		REPORTING RESULTS (µg/L)		REQUIRED SAMPLE TYPE
		Required	Used	Recommended	Used	Grab	Composite	
83-32-9	Acenaphthene	625	625	10	5	<5		G or C
120-12-7	Anthracene	625	625	10	5	<5		G or C
92-87-5	Benzidine	--	625	--	5	<5		G or C
56-55-3	Benzo (a) anthracene	625	625	10	5	<5		G or C
205-99-2	Benzo (b) fluoranthene	625	625	10	5	<5		G or C
207-08-9	Benzo (k) fluoranthene	625	625	10	5	<5		G or C
50-32-8	Benzo (a) pyrene	625	625	10	5	<5		G or C
111-44-4	Bis 2-Chloroethyl Ether	--	625	--	5	<5		G or C
108-60-1	Bis 2-Chloroisopropyl Ether	--	625	--	5	<5		G or C
85-68-7	Butyl benzyl phthalate	625	625	10	5	<5		G or C
91-58-7	2-Chloronaphthalene	--	625	--	5	<5		G or C
218-01-9	Chrysene	625	625	10	5	<5		G or C
53-70-3	Dibenz(a,h)anthracene	625	625	20	5	<5		G or C
84-74-2	Dibutyl phthalate (synonym = Di-n-Butyl	625	625	10	5	<5		G or C
95-50-1	1,2-Dichlorobenzene	624	624	10	10	<10		G or C
541-73-1	1,3-Dichlorobenzene	624	624	10	10	<10		G or C
106-46-7	1,4-Dichlorobenzene	624	624	10	10	<10		G or C
91-94-1	3,3-Dichlorobenzidine	--	625	--	5	<5		G or C
84-66-2	Diethyl phthalate	625	625	10	5	<5		G or C
117-81-7	Bis-2-ethylhexyl phthalate	625	625	10	5	<5		G or C
131-11-3	Dimethyl phthalate	--	625	--	5	<5		G or C
121-14-2	2,4-Dinitrotoluene	625	625	10	5	<5		G or C
122-66-7	1,2-Diphenylhydrazine	--	625	--	5	<5		G or C
206-44-0	Fluoranthene	625	625	10	5	<5		G or C
86-73-7	Fluorene	625	625	10	5	<5		G or C
118-74-1	Hexachlorobenzene	--	625	--	5	<5		G or C
87-68-3	Hexachlorobutadiene	--	625	--	5	<5		G or C
77-47-4	Hexachlorocyclopentadiene	--	625	--	5	<5		G or C
67-72-1	Hexachloroethane	--	625	--	5	<5		G or C
193-39-5	Indeno(1,2,3-cd)pyrene	625	625	20	5	<5		G or C
78-59-1	Isophorone	625	625	10	5	<5		G or C
98-95-3	Nitrobenzene	625	625	10	5	<5		G or C
62-75-9	N-Nitrosodimethylamine	--	625	--	5	<5		G or C
621-64-7	N-Nitrosodi-n-propylamine	--	625	--	5	<5		G or C
86-30-6	N-Nitrosodiphenylamine	--	625	--	5	<5		G or C
129-00-0	Pyrene	625	625	10	5	<5		G or C
120-82-1	1,2,4-Trichlorobenzene	625	625	10	5	<5		G or C

Kinder Morgan Transmix Co., LLC (VA0086151): Outfall 002 Summary of Attachment A Test Results

2012 Permit Reissuance

VOLATILES								
CASRN#	CHEMICAL	EPA ANALYSIS		QUANTIFICATION LEVEL (µg/L)		REPORTING RESULTS (µg/L)		REQUIRED SAMPLE TYPE
		Required	Used	Recommended	Used	Grab	Composite	
107-02-8	Acrolein	--	624	--	50	<50		G
107-13-1	Acrylonitrile	--	624	--	10	<10		G
71-43-2	Benzene	624	624	10	10	<10		G
75-25-2	Bromoform	624	624	10	10	<10		G
56-23-5	Carbon Tetrachloride	624	624	10	10	<10		G
108-90-7	Chlorobenzene (synonym=monochlorobenzene)	624	624	50	10	<10		G
124-48-1	Chlorodibromomethane	624	624	10	10	<10		G
67-66-3	Chloroform	624	624	10	10	<10		G
75-09-2	Dichloromethane (synonym = methylene chloride)	624	624	20	20	<20		G
75-27-4	Dichlorobromomethane	624	624	10	10	<10		G
107-06-2	1,2-Dichloroethane	624	624	10	10	<10		G
75-35-4	1,1-Dichloroethylene	624	624	10	10	<10		G
156-60-5	1,2-trans-dichloroethylene	--	624	--	10	<10		G
78-87-5	1,2-Dichloropropane	--	624	--	10	<10		G
542-75-6	1,3-Dichloropropene	--	624	--	10	<10		G
100-41-4	Ethylbenzene	624	624	10	10	<10		G
74-83-9	Methyl Bromide	--	624	--	10	<10		G
79-34-5	1,1,2,2-Tetrachloroethane	--	624	--	10	<10		G
127-18-4	Tetrachloroethylene	624	624	10	10	<10		G
10-88-3	Toluene	624	624	10	10	<10		G
79-00-5	1,1,2-Trichloroethane	--	624	--	10	<10		G
79-01-6	Trichloroethylene	624	624	10	10	<10		G
75-01-4	Vinyl Chloride	624	624	10	10	<10		G

RADIONUCLIDES						
CASRN#	CHEMICAL	EPA ANALYSIS USED	RECOMMENDED QUANTIFICATION LEVEL	REPORTING RESULTS (pCi/L)		REQUIRED SAMPLE TYPE
				Grab	Composite	
	Strontium 90 (pCi/L)	--				G or C
	Tritium (pCi/L)	--				G or C
	Uranium (pCi/L)	--				G or C
	Radium 226 (pCi/L)	--				G or C
	Radium 228 (pCi/L)	--				G or C
	Combined Ra226 & Ra228 (pCi/L)	--				G or C
	Beta Particle & Photon Activity (mrem/yr)	--				G or C
	Gross Alpha Particle Activity (pCi/L)	--				G or C

ACID EXTRACTABLES								
CASRN#	CHEMICAL	EPA ANALYSIS		QUANTIFICATION LEVEL (µg/L)		REPORTING RESULTS (µg/L)		REQUIRED SAMPLE TYPE
		Required	Used	Recommended	Used	Grab	Composite	
95-57-8	2-Chlorophenol	625	625	10	5	<5		G or C
120-83-2	2,4 Dichlorophenol	625	625	10	5	<5		G or C
105-67-9	2,4 Dimethylphenol	625	625	10	5	<5		G or C
51-28-5	2,4-Dinitrophenol	--	625	--	20	<20		G or C
534-52-1	2-Methyl-4,6-Dinitrophenol (synonym=4,6 Dinitro-o-cresol)	--	625	--	5	<5		G or C
25154-52-3	Nonylphenol	--	625M	--	5	<5		G or C
87-86-5	Pentachlorophenol	625	625	50	10	<10		G or C
108-95-2	Phenol	625	625	10	5	<5		G or C
88-06-2	2,4,6-Trichlorophenol	625	625	10	5	<5		G or C

Kinder Morgan Transmix Co., LLC (VA0086151): Outfall 002 Summary of Attachment A Test Results
2012 Permit Reissuance

MISCELLANEOUS

CASRN#	CHEMICAL	EPA ANALYSIS		QUANTIFICATION LEVEL (mg/L)		REPORTING RESULTS (mg/L)		REQUIRED SAMPLE TYPE
		Required	Used	Recommended	Used	Grab	Composite	
776-41-7	Ammonia as NH3-N	350.1	350.1	0.2	0.1	<0.1		C
16887-00-6	Chlorides	--						C
7782-50-5	Chlorine, Total Residual	--		0.1		1.3		G
57-12-5	Cyanide, Free	--	Kelada-01	0.01	0.01	<0.01		G
94-75-7	2,4 Dichlorophenoxy acetic acid (synonym = 2,4-D)	--						G
1746-01-6	Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)	1613		1E-08				G
N/A	*E. coli* / *Enterococcus* (N/CML)	--	Colilert 18/QT	--	1	225 mpn/100 mL		G
N/A	Foaming Agents (as MBAS)	--						G
6/4/7783	Hydrogen Sulfide	--	4500S2H	--	1	<1		G
14797-55-8	Nitrate as N (mg/L)	--	4500NO3F	--	0.1	0.39		C
N/A	Sulfate (mg/L)	--						C
N/A	Total Dissolved Solids (mg/L)	--						C
60-10-5	Tributyltin [7]	NBSR 85-3295	GC/FPD	--	0.000030	<0.000030		G or C
93-72-1	2-(2,4,5-Trichlorophenoxy) propionic acid (synonym = Silvex)	--						G
	Hardness (mg/L as $CaCO_3$)	--	2340B	--	0.5	8.9		G or C

OTHER POLLUTANTS REPORTED >QL

These pollutants are not required to be reported by either Attachment A or Form 2C.

CASRN#	CHEMICAL	EPA ANALYSIS		QUANTIFICATION LEVEL (µg/L)		REPORTING RESULTS (µg/L)		REQUIRED SAMPLE TYPE
		Required	Used	Recommen	Used	Grab	Composite	
--	Total Calcium	--	200.7	--	50	2960		

= Testing for this pollutant was not required.
= The Quantification Level (QL) used by the laboratory was greater than the QL required by DEQ
= Sample results greater than QL used by laboratory
= Pollutant testing results not observed on submitted laboratory reports

Kinder Morgan Transmix Co., LLC (VA0086151): Outfall 002 Summary of Form 2C Test Results

2012 Permit Reissuance

V. INTAKE AND EFFLUENT CHARACTERISTICS												OUTFALL No. 002
PART A												
	Effluent							Units		Intake		
	Maximum Daily Value		Maximum 30-day Value		Long Term Average		NO. of Analyses			Long Term Average Value		NO. of Analyses
Pollutant	Concentration	Mass	Concentration	Mass	Concentration	Mass		Concentration	Mass	Concentration	Mass	
a. Biochemical Oxygen Demand (BOD)	<2	<0.55					1	mg/L	kg			
b. Chemical Oxygen Demand	<10	<2.7					1	mg/L	kg			
c. Total Organic Carbon	8.06	6.00			3.34	0.90	20	mg/L	kg			
d. Total Suspended Solids (TSS)	1.6	0.44					1	mg/L	kg			
e. Ammonia (as N)	<0.1	<0.03					1	mg/L	kg			
f. Flow	0.864				0.059		20	MGD				
g. Temperature (winter)	11.9				9.3		20	°C				
h. Temperature (summer)	27.5				24.3		20	°C				
i. pH	Minimum	Maximum	Minimum	Maximum			20	STANDARD UNITS				
	6.02	9										

POLLUTANTS OF CONCERN: Form 2C

Note: This section includes sample test results for pollutants that were noted in Form 2C (Item V.D & Item VI) as being produced as a byproduct of the facility's manufacturing process or which may be present in the facility's discharge. In addition, those pollutants that were marked "Believed Present" in Form 2C (Item V.B & Item V.C) are listed below **only if testing indicated that the respective pollutant was detected at a concentration greater than the QL used by the laboratory.**

CHEMICAL	EPA ANALYSIS		QUANTIFICATION LEVEL (µg/L)		REPORTING RESULTS (µg/L)		REQUIRED SAMPLE TYPE	
	Required	Used	Recom.	Used	Grab	Composite		
Naphthalene	--	624	--	10	<10		--	Required to be tested in accordance with DEQ agency guidance (Permit Manual, Section IN-5, Pg.4: revised January 27, 2010). The same test results may also be listed for these pollutants in Attachment A.
Ethylbenzene	624	624	10.00	10	<10		--	
Toluene	624	624	10.00	10	<10		--	
Xylenes (Total)	--	624	--	10	<10		--	
Benzene	624	624	10.00	10	<10		--	
Denatured Alcohol (results are for Ethanol)	--	SW8360B	--	80	<80		--	
Oil & Grease	--	1664A	--	10000	<10000			
Total Dissolved Solids	--	2540C	--	10000	35000		--	Test results indicated concentrations greater than the QL used by the laboratory. The same test results may also be listed the Attachment A.
Nitrate-Nitrite	--	4500NO3F	--	100	390		--	
Total Barium	--	200.7	--	10	16.3		--	
Total Iron	--	200.7	--	10	139.1		--	
Total Magnesium	--	200.7	--	10	276.8		--	
Total Copper	--	200.9	--	3	8.6		--	
Total Calcium	--	200.7	--	50	2960		--	
Total Zinc	--	200.7	--	10	43.8		--	

Attachment G

Effluent Limitation Analyses

MSTRANTI DATA SOURCE REPORT - Outfall 002
Kinder Morgan Transmix Co., LLC (VA0086151)
2012 Permit Reissuance

Stream Information	
Mean Hardness	Derived from data collected from James River monitoring station 2-JMS104.16
90% Temperature (annual)	
90% Temperature (wet season)	
90% Maximum pH	
10% Maximum pH	
Tier Designation	Flow Frequency Memorandum from Jennifer V. Palmore, P.G. dated February 4, 2011
Stream Flows	
All Data	Flow Frequency Memorandum from Jennifer V. Palmore, P.G. dated February 4, 2011
Mixing Information	
All Data	MIX.exe
Effluent Information	
Mean Hardness	Water Quality Standards testing indicated a hardness value of 8.9 mg/L. MSTRANTI requires a minimum input of 25 mg/L, therefore the minimum required value was inserted.
90% Temperature (annual)	Max value reported on EPA Form 2C
90% Maximum pH	DMR data submitted between 2006 and 2011
10% Maximum pH	
Discharge Flow	

Mixing Zone Predictions for Kinder Morgan Transmix Co., LLC (VA0086151) Outfall 002 (2012 Permit Re-issuance)

Effluent Flow = 0.73 MGD
Stream 7Q10 = 455 MGD
Stream 30Q10 = 596 MGD
Stream 1Q10 = 400 MGD
Stream slope = 0.00038 ft/ft
Stream width = 470 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 2.8504 ft
Length = 87405.64 ft
Velocity = .5266 ft/sec
Residence Time = 1.9211 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 3.3537 ft
Length = 76223.1 ft
Velocity = .586 ft/sec
Residence Time = 1.5054 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 2.6378 ft
Length = 93294.45 ft
Velocity = .5004 ft/sec
Residence Time = 51.7932 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 1.93% of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Kinder Morgan Transmix Co., LLC Permit No.: VA0086151

Receiving Stream: James River Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	65.2	mg/L	1Q10 (Annual) =	400	MGD	Annual - 1Q10 Mix =	1.93	%	Mean Hardness (as CaCO3) =	25	mg/L
90% Temperature (Annual) =	28.7	deg C	7Q10 (Annual) =	455	MGD	- 7Q10 Mix =	100	%	90% Temp (Annual) =	27.5	deg C
10% Temperature (Annual) =	5.4	deg C	30Q10 (Annual) =	596	MGD	- 30Q10 Mix =	100	%	90% Temp (Wet season) =	NA	deg C
90% Temperature (Wet season) =	NA	deg C	1Q10 (Wet season) =	1023	MGD	Wet Season - 1Q10 Mix =	100	%	90% Maximum pH =	8.1	SU
90% Maximum pH =	8	SU	30Q10 (Wet season) =	1504	MGD	- 30Q10 Mix =	100	%	10% Maximum pH =	6.8	SU
10% Maximum pH =	7.2	SU	30Q5 =	667	MGD				Heated Discharge? (Y/N) =	N	
Tier Designation (1 or 2) =	1		Harmonic Mean =	2062	MGD				Discharge Flow =	0.73	MGD
Public Water Supply (PWS) Y/N? =	N										
Trout Present Y/N? =	N										
Early Life Stages Present Y/N? =	Y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**				Lowest LTA
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**	
Acenapthene	0	--	--	na	9.9E+02	--	--	na	9.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.1E+05**	--
Acrolein	0	--	--	na	9.3E+00	--	--	na	8.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.5E+03**	--
Acrylonitrile[C]	0	--	--	na	2.5E+00	--	--	na	7.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.1E+03**	--
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.5E+01	--	na	1.4E+00	--	--	--	--	--	--	--	--	**3.5E+01**	**--**	**na**	**1.4E+00**	1.43E+01
Ammonia-N (mg/l) (Yearly)	0	8.28E+00	9.75E-01	na	--	9.59E+01	7.97E+02	na	--	--	--	--	--	--	--	--	--	**9.59E+01**	**7.97E+02**	**na**	**--**	3.94E+01
Ammonia-N (mg/l) (High Flow)	0	8.41E+00	#VALUE!	na	--	1.2E+04	#VALUE!	na	--	--	--	--	--	--	--	--	--	**1.2E+04**	**#VALUE!**	**na**	**--**	#VALUE!
Anthracene	0	--	--	na	4.0E+04	--	--	na	3.7E+07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.7E+07**	--
Antimony	0	--	--	na	6.4E+02	--	--	na	5.9E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E+05**	--
Arsenic	0	3.4E+02	1.5E+02	na	--	3.9E+03	9.4E+04	na	--	--	--	--	--	--	--	--	--	**3.9E+03**	**9.4E+04**	**na**	**--**	1.62E+03
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.4E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+06**	--
Benzidine[C]	0	--	--	na	2.0E-03	--	--	na	5.7E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.7E+00**	--
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+02**	--
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+02**	--
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+02**	--
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+02**	--
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+04**	--
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	5.9E+07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E+07**	--
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	6.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.2E+04**	--
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	4.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+06**	--
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+06**	--
Cadmium	0	2.3E+00	8.1E-01	na	--	2.6E+01	5.1E+02	na	--	--	--	--	--	--	--	--	--	**2.6E+01**	**5.1E+02**	**na**	**--**	1.08E+01
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	4.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.5E+04**	--
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.8E+01	2.7E+00	na	2.3E+01	--	--	--	--	--	--	--	--	**2.8E+01**	**2.7E+00**	**na**	**2.3E+01**	1.61E+00
Chloride	0	8.6E+05	2.3E+05	na	--	1.0E+07	1.4E+08	na	--	--	--	--	--	--	--	--	--	**1.0E+07**	**1.4E+08**	**na**	**--**	4.09E+06

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**				Lowest LTA
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**	
TRC	0	1.9E+01	1.1E+01	na	--	2.2E+02	6.9E+03	na	--	--	--	--	--	--	--	--	--	**2.2E+02**	**6.9E+03**	**na**	**--**	9.04E+01
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.5E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+06**	--
Chlorodibromomethane [C]	0	--	--	na	1.3E+02	--	--	na	3.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.7E+05**	--
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.0E+07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+07**	--
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.5E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+06**	--
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+05**	--
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	9.6E-01	2.6E+01	na	--	--	--	--	--	--	--	--	--	**9.6E-01**	**2.6E+01**	**na**	**--**	3.95E-01
Chromium III	0	3.8E+02	5.2E+01	na	--	4.4E+03	3.3E+04	na	--	--	--	--	--	--	--	--	--	**4.4E+03**	**3.3E+04**	**na**	**--**	1.83E+03
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.9E+02	6.9E+03	na	--	--	--	--	--	--	--	--	--	**1.9E+02**	**6.9E+03**	**na**	**--**	7.61E+01
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	5.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+01**	--
Copper	0	8.5E+00	6.2E+00	na	--	9.9E+01	3.9E+03	na	--	--	--	--	--	--	--	--	--	**9.9E+01**	**3.9E+03**	**na**	**--**	4.06E+01
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.5E+02	3.2E+03	na	1.5E+07	--	--	--	--	--	--	--	--	**2.5E+02**	**3.2E+03**	**na**	**1.5E+07**	1.05E+02
DDD [C]	0	--	--	na	3.1E-03	--	--	na	8.8E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.8E+00**	--
DDE [C]	0	--	--	na	2.2E-03	--	--	na	6.2E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.2E+00**	--
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.3E+01	6.2E-01	na	6.2E+00	--	--	--	--	--	--	--	--	**1.3E+01**	**6.2E-01**	**na**	**6.2E+00**	3.75E-01
Demeton	0	--	1.0E-01	na	--	--	6.2E+01	na	--	--	--	--	--	--	--	--	--	**--**	**6.2E+01**	**na**	**--**	3.75E+01
Diazinon	0	1.7E-01	1.7E-01	na	--	2.0E+00	1.1E+02	na	--	--	--	--	--	--	--	--	--	**2.0E+00**	**1.1E+02**	**na**	**--**	8.09E-01
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+02**	--
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.2E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+06**	--
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	8.8E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.8E+05**	--
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+05**	--
3,3-Dichlorobenzidine [C]	0	--	--	na	2.8E-01	--	--	na	7.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.9E+02**	--
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	4.8E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+05**	--
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	1.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+06**	--
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	6.5E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+06**	--
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	9.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.1E+06**	--
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	2.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.7E+05**	--
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
1,2-Dichloropropane [C]	0	--	--	na	1.5E+02	--	--	na	4.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.2E+05**	--
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	5.9E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E+05**	--
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.8E+00	3.5E+01	na	1.5E+00	--	--	--	--	--	--	--	--	**2.8E+00**	**3.5E+01**	**na**	**1.5E+00**	1.14E+00
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	4.0E+07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+07**	--
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	7.8E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.8E+05**	--
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.0E+09	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+09**	--
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	4.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.1E+06**	--
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	4.8E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+06**	--
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.6E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+05**	--
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	9.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.6E+04**	--
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	4.7E-05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-05**	--
1,2-Diphenylhydrazine [C]	0	--	--	na	2.0E+00	--	--	na	5.7E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.7E+03**	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**				Lowest LTA
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**	
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.5E+00	3.5E+01	na	8.1E+04	--	--	--	--	--	--	--	--	**2.5E+00**	**3.5E+01**	**na**	**8.1E+04**	1.05E+00
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.5E+00	3.5E+01	na	8.1E+04	--	--	--	--	--	--	--	--	**2.5E+00**	**3.5E+01**	**na**	**8.1E+04**	1.05E+00
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.5E+00	3.5E+01	--	--	--	--	--	--	--	--	--	--	**2.5E+00**	**3.5E+01**	**--**	**--**	1.05E+00
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	8.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.1E+04**	--
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.0E+00	2.2E+01	na	5.5E+01	--	--	--	--	--	--	--	--	**1.0E+00**	**2.2E+01**	**na**	**5.5E+01**	4.09E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	2.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.7E+02**	--
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	1.9E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+06**	--
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+05**	--
Fluorene	0	--	--	na	5.3E+03	--	--	na	4.8E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+06**	--
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Guthion	0	--	1.0E-02	na	--	--	6.2E+00	na	--	--	--	--	--	--	--	--	--	**--**	**6.2E+00**	**na**	**--**	3.75E+00
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	6.0E+00	2.4E+00	na	2.2E+00	--	--	--	--	--	--	--	--	**6.0E+00**	**2.4E+00**	**na**	**2.2E+00**	1.43E+00
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	6.0E+00	2.4E+00	na	1.1E+00	--	--	--	--	--	--	--	--	**6.0E+00**	**2.4E+00**	**na**	**1.1E+00**	1.43E+00
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	8.2E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.2E+00**	--
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	5.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+05**	--
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+02**	--
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	4.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E+02**	--
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.1E+01	--	na	5.1E+03	--	--	--	--	--	--	--	--	**1.1E+01**	**--**	**na**	**5.1E+03**	4.52E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+06**	--
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	9.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.3E+04**	--
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.2E+03	na	--	--	--	--	--	--	--	--	--	**--**	**1.2E+03**	**na**	**--**	7.50E+02
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+02**	--
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	2.7E+07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.7E+07**	--
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**	0.00E+00
Lead	0	6.4E+01	7.8E+00	na	--	7.4E+02	4.9E+03	na	--	--	--	--	--	--	--	--	--	**7.4E+02**	**4.9E+03**	**na**	**--**	3.06E+02
Malathion	0	--	1.0E-01	na	--	--	6.2E+01	na	--	--	--	--	--	--	--	--	--	**--**	**6.2E+01**	**na**	**--**	3.75E+01
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.6E+01	4.8E+02	- -	- -	--	--	--	--	--	--	--	--	**1.6E+01**	**4.8E+02**	**- -**	**- -**	6.66E+00
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.4E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+06**	--
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.7E+07	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+07**	--
Methoxychlor	0	--	3.0E-02	na	--	--	1.9E+01	na	--	--	--	--	--	--	--	--	--	**--**	**1.9E+01**	**na**	**--**	1.13E+01
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**	0.00E+00
Nickel	0	1.2E+02	1.4E+01	na	4.6E+03	1.4E+03	8.8E+03	na	4.2E+06	--	--	--	--	--	--	--	--	**1.4E+03**	**8.8E+03**	**na**	**4.2E+06**	5.77E+02
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	6.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.3E+05**	--
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	8.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.5E+04**	--
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+05**	--
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+04**	--
Nonylphenol	0	2.8E+01	6.6E+00	--	--	3.2E+02	4.1E+03	na	--	--	--	--	--	--	--	--	--	**3.2E+02**	**4.1E+03**	**na**	**--**	1.33E+02
Parathion	0	6.5E-02	1.3E-02	na	--	7.5E-01	8.1E+00	na	--	--	--	--	--	--	--	--	--	**7.5E-01**	**8.1E+00**	**na**	**--**	3.09E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**				Lowest LTA
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**	
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	8.7E+00	na	1.8E+00	--	--	--	--	--	--	--	--	**--**	**8.7E+00**	**na**	**1.8E+00**	5.25E+00
Pentachlorophenol [C]	0	1.0E+01	8.2E+00	na	3.0E+01	1.2E+02	5.1E+03	na	8.5E+04	--	--	--	--	--	--	--	--	**1.2E+02**	**5.1E+03**	**na**	**8.5E+04**	4.81E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	7.9E+08	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.9E+08**	--
Pyrene	0	--	--	na	4.0E+03	--	--	na	3.7E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.7E+06**	--
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	--	--
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.3E+02	3.1E+03	na	3.8E+06	--	--	--	--	--	--	--	--	**2.3E+02**	**3.1E+03**	**na**	**3.8E+06**	9.51E+01
Silver	0	1.5E+00	--	na	--	1.7E+01	--	na	--	--	--	--	--	--	--	--	--	**1.7E+01**	**--**	**na**	**--**	7.16E+00
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+05**	--
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	9.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.3E+04**	--
Thallium	0	--	--	na	4.7E-01	--	--	na	4.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.3E+02**	--
Toluene	0	--	--	na	6.0E+03	--	--	na	5.5E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.5E+06**	--
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	8.5E+00	1.2E-01	na	7.9E+00	--	--	--	--	--	--	--	--	**8.5E+00**	**1.2E-01**	**na**	**7.9E+00**	7.50E-02
Tributyltin	0	4.6E-01	7.2E-02	na	--	5.3E+00	4.5E+01	na	--	--	--	--	--	--	--	--	--	**5.3E+00**	**4.5E+01**	**na**	**--**	2.19E+00
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	6.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.4E+04**	--
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	4.5E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.5E+05**	--
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	8.5E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.5E+05**	--
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	6.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.8E+04**	--
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**	--
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	6.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.8E+04**	--
Zinc	0	7.8E+01	8.2E+01	na	2.6E+04	9.0E+02	5.1E+04	na	2.4E+07	--	--	--	--	--	--	--	--	**9.0E+02**	**5.1E+04**	**na**	**2.4E+07**	3.70E+02

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	5.9E+05
Arsenic	1.6E+03
Barium	na
Cadmium	1.1E+01
Chromium III	1.8E+03
Chromium VI	7.4E+01
Copper	3.9E+01
Iron	na
Lead	3.0E+02
Manganese	na
Mercury	6.5E+00
Nickel	5.6E+02
Selenium	9.3E+01
Silver	7.0E+00
Zinc	3.6E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

10/7/2011 10:14:49 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = Dissolved Arsenic
Chronic averaging period = 4
WLAa = 3900
WLAc = 94000
Q.L. = 1.0
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 5
Variance = 9
C.V. = 0.6
97th percentile daily values = 12.1670
97th percentile 4 day average = 8.31895
97th percentile 30 day average= 6.03026
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

5

10/7/2011 10:17:09 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = Chromium III
Chronic averaging period = 4
WLAa = 4400
WLAc = 33000
Q.L. = 3.6
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 10
Variance = 36
C.V. = 0.6
97th percentile daily values = 24.3341
97th percentile 4 day average = 16.6379
97th percentile 30 day average= 12.0605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

10

10/7/2011 10:19:18 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = Chromium VI
Chronic averaging period = 4
WLAa = 190
WLAc = 6900
Q.L. = 0.5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 5
Variance = 9
C.V. = 0.6
97th percentile daily values = 12.1670
97th percentile 4 day average = 8.31895
97th percentile 30 day average= 6.03026
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

5.0

10/7/2011 10:19:33 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = Copper
Chronic averaging period = 4
WLAa = 99
WLAc = 3900
Q.L. = 0.5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 8.6
Variance = 26.6256
C.V. = 0.6
97th percentile daily values = 20.9273
97th percentile 4 day average = 14.3085
97th percentile 30 day average= 10.3720
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8.6

10/7/2011 10:21:15 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = DDT
Chronic averaging period = 4
WLAa = 13
WLAc = 0.62
Q.L. = 0.1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .25
Variance = .0225
C.V. = 0.6
97th percentile daily values = .608354
97th percentile 4 day average = .415947
97th percentile 30 day average= .301513
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.25

10/7/2011 10:27:04 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = Dissolved Lead
Chronic averaging period = 4
WLAa = 740
WLAc = 4900
Q.L. = 0.5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 2
Variance = 1.44
C.V. = 0.6
97th percentile daily values = 4.86683
97th percentile 4 day average = 3.32758
97th percentile 30 day average= 2.41210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

2

10/7/2011 10:28:17 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = Dissolved Nickel
Chronic averaging period = 4
WLAa = 1400
WLAc = 8800
Q.L. = 0.94
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 3
Variance = 3.24
C.V. = 0.6
97th percentile daily values = 7.30025
97th percentile 4 day average = 4.99137
97th percentile 30 day average= 3.61815
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

3

10/7/2011 10:29:42 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = TR Selenium
Chronic averaging period = 4
WLAa = 230
WLAc = 3100
Q.L. = 2.0
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 3
Variance = 3.24
C.V. = 0.6
97th percentile daily values = 7.30025
97th percentile 4 day average = 4.99137
97th percentile 30 day average= 3.61815
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

3

10/7/2011 10:23:49 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = Dissolved Silver
Chronic averaging period = 4
WLAa = 17
WLAc =
Q.L. = 0.2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = .5
Variance = .09
C.V. = 0.6
97th percentile daily values = 1.21670
97th percentile 4 day average = .831895
97th percentile 30 day average= .603026
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.5

10/7/2011 10:25:17 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = Dissolved Zinc
Chronic averaging period = 4
WLAa = 900
WLAc = 51000
Q.L. = 2.0
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 43.8
Variance = 690.638
C.V. = 0.6
97th percentile daily values = 106.583
97th percentile 4 day average = 72.8740
97th percentile 30 day average= 52.8251
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

43.8

Total Residual Chlorine

10/7/2011 10:32:19 AM

Facility = Kinder Morgan Transmix Co., LLC
Chemical = TRC (3/21/2011 data)
Chronic averaging period = 4
WLAa = 220
WLAc = 6900
Q.L. = 20
 # samples/mo. = 1
 # samples/wk. = 1

Summary of Statistics:

 # observations = 5
Expected Value = 37.1941
Variance = 498.027
C.V. = 0.6
97th percentile daily values = 90.5090
97th percentile 4 day average = 61.8833
97th percentile 30 day average= 44.8581
 # < Q.L. = 1
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

1300
50
20
40
10

Please note: The 2012 permit was originally drafted with a TRC limitation due to a single data point of 1.3 mg/L reported with the application. The permittee submitted 5 new data points on 3/25/2011 representing samples taken on 3/21/2011 (see below). The HACH method 8167 has a detection range of 0.02 mg/L-2.0 mg/L, and therefore the QL for the above STATS analysis was set at 20 µg/L. The 4th sample in the data set from 3/21/2011 is listed as 0.00 mg/L and was dropped from this analysis because it is not usable. Please see the following email correspondence and HACH Method 8167 instructions.

TABLE 1
Addendum to Permit Renewal Application
Additional Field Chlorine Sampling Results
Stormwater Discharge - Outfall 002
Kinder Morgan Deepwater Terminal
Richmond, Virginia
3/21/2011

Sample	Date	Time	Chlorine (mg/L)
1	3/21/2011	12:55	0.05
2	3/21/2011	13:10	0.02
3	3/21/2011	13:30	0.04
4	3/21/2011	14:15	0.00
5	3/21/2011	14:30	0.01

Note: The stormwater discharge from Outfall 002 was analyzed for total residual chlorine to support the renewal of the existing VPDES permit. Samples were collected from the outfall and analyzed in the field using the Hach DPD Method 8167 colorimetric method, an EPA approved method equivalent to Standard Method 4500-Cl G.

Kazio, Jeremy (DEQ)

From: Thomas Andrake [TAndrake@gesonline.com]
Sent: Friday, March 25, 2011 11:01 AM
To: Kazio, Jeremy (DEQ)
Subject: RE: Kinder Morgan - Deepwater VPDES Permit Renewal - Chlorine results
Attachments: Chlorine sample data - 3.21.2011.pdf

Jeremy

Per our conversation yesterday, please find attached the revised the total residual chlorine results from the sampling event conducted on 3/21/2011. The table was revised indicating DPD Method 8167 was utilized for the analysis of total residual chlorine. As I discussed with you, I mistakenly put the wrong method of analysis down on the table. I apologize for the confusion. Also, this was the same method used for the initial chlorine analysis on 10/15/2010.

Additionally, per our email below, we would like for the DEQ to consider using only the recent sampling data collected on 3/21/2011 for preparation of the draft VPDES permit for the Deepwater Terminal, because of the high discrepancy between the data, the high potential moisture was present on 10/15/2010 sample vial producing an elevated result, and that chlorine is not present on site in any of the process areas. We may also be collecting some additional total residual chlorine samples during the next monthly sampling event to support the permit applications and will submit to you if samples are collected and analyzed.

If you have any questions or need additional information please let me know. Thanks again and I apologize for the confusion in the sample method.

T.R. Andrake

From: Kazio, Jeremy (DEQ) [mailto:Jeremy.Kazio@deq.virginia.gov]
Sent: Thursday, March 24, 2011 2:04 PM
To: Thomas Andrake
Subject: RE: Kinder Morgan - Deepwater VPDES Permit Renewal - Chlorine results

TR,

I'm sorry to say this, but it looks like the HACH Method 8021 is a Free Available Chlorine (FAC) analysis rather than a Total Residual Chlorine (TRC) analysis. Total Residual Chlorine is what criteria in the Water Quality Standards are based on because chlorine compounds in both Free and Combined forms are potentially harmful to aquatic life.

I've attached two documents from HACH's website. The first one is a listing of HACH methods approved or recognized by EPA, and the other is the 8021 method instructions.

The listing includes TRC methods 8167 & 8168, which I think are DPD methods. I believe that the same colorimeter/spectrophotometer may be used for both FAC and TRC DPD tests, but the reagent packets for the TRC tests contain iodine, which is oxidized by monochloramine and thus provides a measureable indicator for combined chlorine.

I apologize but I cannot accept the data submitted earlier for evaluation against the TRC standard. If I'm mistaken about all of this, please don't hesitate to let me know.

You may submit TRC data up until the point at which the draft permit goes to public notice, which may be within the next few weeks to a month. Thank you, and please let me know if you have any questions.

From: Thomas Andrake [mailto:TAndrake@gesonline.com]
Sent: Thursday, March 24, 2011 11:43 AM

To: Kazio, Jeremy (DEQ)
Cc: Davis, Patrick (Richmond)
Subject: Kinder Morgan - Deepwater VPDES Permit Renewal - Chlorine results

Jeremy

Per our previous conversation, please find attached a copy of the analytical results for the chlorine analysis from the stormwater discharge at the Kinder Morgan Deepwater Terminal. These results are being provided as additional data to support the renewal of the VPDES permit for the facility. As indicated in the attached table, the chlorine results for this sampling event were significantly lower than the grab sample previously collected and analyzed for the permit application.

After researching potential reasons why the previous chlorine sample result was significantly higher than in the latest sampling event, it was discovered in discussions with the equipment manufacturer (Hach), that moisture present on the ampule containing the stormwater sample, used to read the chlorine concentration, or moisture within the colorimeter will generate an elevated concentration reading. The reason for this is water droplets will cause the light in colorimeter to bend the wrong way reading over a larger color spectrum and producing a higher reading.

In reviewing our field notes from the sampling event (10/15/2010) for the initial chlorine sample, the weather condition for that day was rainy. Therefore, the possibility of moisture remaining on the ampule prior to being analyzed and/or moisture entering the instrument is high, thus potentially causing the colorimeter to provide an inaccurately high reading.

Because of the high discrepancy in the analytical data and given the potential reason why the sample collected on 10/15/2011 was elevated, Kinder Morgan would like to request for DEQ to consider using only the recent sampling data collected on 3/21/2011 for preparation of the draft VPDES permit for the Deepwater Terminal.

If you have any questions please do not hesitate to give me a call.

Thanks!!!

T.R. Andrake
Groundwater & Environmental Services, Inc.
23 South 13th Street, Suite 201
Richmond, VA 23219
P: 866.222.7786 ext. 3765
C: 804.641.9103
tandrake@gesonline.com

Attachment H

NPDES Permit Rating Worksheet

NPDES PERMIT RATING WORK SHEET

► Regular Addition
☐ DiscretionaryAddition
☐ Score change, but no status change
☐ Deletion

NPDES NO. VA0086151

Facility Name: Kinder Morgan Transmix Co., LLC

City: Richmond, VA

Receiving Water: James River (Lower)

Reach Number: _____

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?
1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate
☐ YES; score is 600 (stop here) ►NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

☐ YES; score is 700 (stop here)
►NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: _____ Primary SIC Code: 5171 Other SIC Codes: _____
Industrial Subcategory Code: _____ (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
► No process waste streams	0	0	☐ 3.	3	15	☐ 7.	7	35
☐ 1.	1	5	☐ 4.	4	20	☐ 8.	8	40
☐ 2.	2	10	☐ 5.	5	25	☐ 9.	9	45
			☐ 6.	6	30	☐ 10.	10	50

Code Number Checked: 0

Total Points Factor 1: 0

FACTOR 2: Flow/Stream Flow Volume (*Complete either Section A or Section B; check only one)*

Section A ☐ Wastewater Flow Only Considered

Wastewater Type (See Instructions)		Code	Points
Type I: Flow < 5 MGD	☐	11	0
Flow 5 to 10 MGD	☐	12	10
Flow > 10 to 50 MGD	☐	13	20
Flow > 50 MGD	☐	14	30
Type II: Flow < 1 MGD	☐	21	10
Flow 1 to 5 MGD	☐	22	20
Flow > 5 to 10 MGD	☐	23	30
Flow > 10 MGD	☐	24	50
Type III: Flow < 1 MGD	☐	31	0
Flow 1 to 5 MGD	☐	32	10
Flow > 5 to 10 MGD	☐	33	20
Flow > 10 MGD	☐	34	30

Section B ► Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10 %	☐	41	0
	10 % to < 50 %	☐	42	10
	> 50 %	☐	43	20
Type II:	< 10 %	►	51	0
	10 % to <50 %	☐	52	20
	> 50 %	☐	53	30

Code Checked from Section A or B: 51

Total Points Factor 2: 0

FACTOR 3: Conventional Pollutants NPDES NO: VA0086151

(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) | |BOD ☐ COD ☐ Other:_____

			Code	*Points*
Permit Limits: (check one)	☐	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	☐	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Code Checked: N/A

Points Scored: 0

B. Total Suspended Solids (TSS)

			Code	*Points*
Permit Limits: (check one)	☐	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	☐	> 1000 to 5000 lbs/day	3	15
	☐	> 5000 lbs/day	4	20

Code Checked: N/A

Points Scored: 0

C. Nitrogen Pollutant: (check one) ☐ Ammonia ► Other: Total Nitrogen (TN)_____

		Nitrogen Equivalent	*Code*	*Points*
Permit Limits: (check one)	►	< 300 lbs/day	1	0
	☐	300 to 1000 lbs/day	2	5
	☐	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Code Checked: 1

Points Scored: 0

Total Points Factor 3: 0

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

► YES (If yes, check toxicity potential number below)

☐ NO (If no, go to Factor 5)

Determine the *human health* toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column ☐ check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
► No process waste streams	0	0	☐ 3.	3	0	☐ 7.	7	15
☐ 1.	1	0	☐ 4.	4	0	☐ 8.	8	20
☐ 2.	2	0	☐ 5.	5	5	☐ 9.	9	25
			☐ 6.	6	10	☐ 10.	10	30

Code Number Checked: 0

Total Points Factor 4: 0

FACTOR 5: Water Quality Factors NPDES NO: VA0086151

A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge:

		Code	Points
☐	Yes	1	10
►	No	2	0

B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

		Code	Points
►	Yes	1	0
☐	No	2	5

C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?

		Code	Points
►	Yes	1	10
☐	No	2	0

Code Number Checked: A 2 B 1 C 1

Points Factor 5: A 0 + B 0 + C 1 = 10 TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. Base Score: Enter flow code here (from Factor 2): 51 *Enter the multiplication factor that corresponds to the flow code:* 0.10

Check appropriate facility HPRI Code (from PCS):

	HPRI#	*Code*	*HPRI Score*
☐	1	1	20
☐	2	2	0
►	3	3	30
☐	4	4	0
☐	5	5	20

HPRI code checked: 3

Flow Code	*Multiplication Factor*
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

Base Score: (HPRI Score) 30 X (Multiplication Factor) 0.10 = 3 (TOTAL POINTS)

B. Additional Points ☐ NEP Program
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

	Code	Points
► Yes	1	10
☐ No	2	0

C. Additional Points ☐ Great Lakes Area of Concern
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see Instructions)

	Code	Points
☐ Yes	1	10
► No	2	0

Code Number Checked: A 3 B 1 C N/A

Points Factor 6: A 3 + B 10 + C 0 = 13 TOTAL

SCORE SUMMARY NPDES NO: VA0086151

Factor	Description	Total Points
1	Toxic Pollutant Potential	0
2	Flows/Streamflow Volume	0
3	Conventional Pollutants	0
4	Public Health Impacts	0
5	Water Quality Factors	10
6	Proximity to Near Coastal Waters	13
	TOTAL (Factors 1 through 6)	23

S1. Is the total score equal to or greater than 80? ☐ Yes (Facility is a major) ► No

S2. If the answer to the above questions is no, would you like this facility to be discretionary major?

► No

☐ Yes (Add 500 points to the above score and provide reason below:

Reason:

NEW SCORE: 23

OLD SCORE: 13

Jeremy Kazio
Permit Reviewer's Name

(804) 527-5044
Phone Number

March 14, 2011
Date

Attachment I

DCR Natural Heritage Review

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

February 22, 2011

Jeremy Kazio
DEQ-PRO
4949-A Cox Road
Glen Allen, VA 23060

Re: VA0086151, Kinder Morgan Operating LA'A' Deepwater Terminal

Dear Mr. Kazio:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, Laura's clubtail (*Stylurus laurae*, G4/S2/NL/NL) has been historically documented in the project vicinity. Laura's clubtail, a state rare dragonfly, ranges from Ohio south to Florida with westward records to Texas (Kondratieff, 2000). In Virginia, there are records across the Piedmont and west to the Ridge and Valley region. Its habitat consists of moderated gradient streams with many shallow riffles and runs (NatureServe, 2009).

Though somewhat tolerant of decreased water quality, threats include activities which alter the water flow or substrate such as: impoundments, channelization, dredging, siltation, agricultural non-point pollution, and municipal and industrial pollution. In addition, timber harvest may increase siltation and cause a decrease in dissolved oxygen as canopy cover is removed and water temperature rises (NatureServe, 2009).

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to storm water management laws/regulations and utilization of new technologies as they become available to improve water quality.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

Our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the

project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Literature Cited

Kondratieff, Boris C. (coordinator). 2000. Dragonflies and Damselflies (Odonata) of the United States. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/distr/insects/dfly/index.htm (Version 12DEC2003). Accessed 25Mar2010.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: March 25, 2010).

Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

WebID: W634320846473125000

Client Project Number: VA0086151

PROJECT INFORMATION

TITLE: Kinder Morgan Operating LA"A" (Deepwater Terminal)

DESCRIPTION: Reissuance of individual VPDES permit no. VA0086151

EXISTING SITE CONDITIONS: Discharge from outfall 002 originates from rainwater collected within bermed area surrounding above ground bulk petroleum storage tanks.

QUADRANGLES: DREWRYS BLUFF

COUNTIES: Henrico,City of Richmond

Latitude/Longitude (DMS): 372853/772522

Acreage: 80

Comments:

REQUESTOR INFORMATION

Priority: No Tier Level: 2 Tax ID:

Contact Name: Jeremy Kazio

Company Name: DEQ-Piedmont Regional Office

Address: 4949-A Cox Road

City: Glen Allen State: VA Zip: 23060

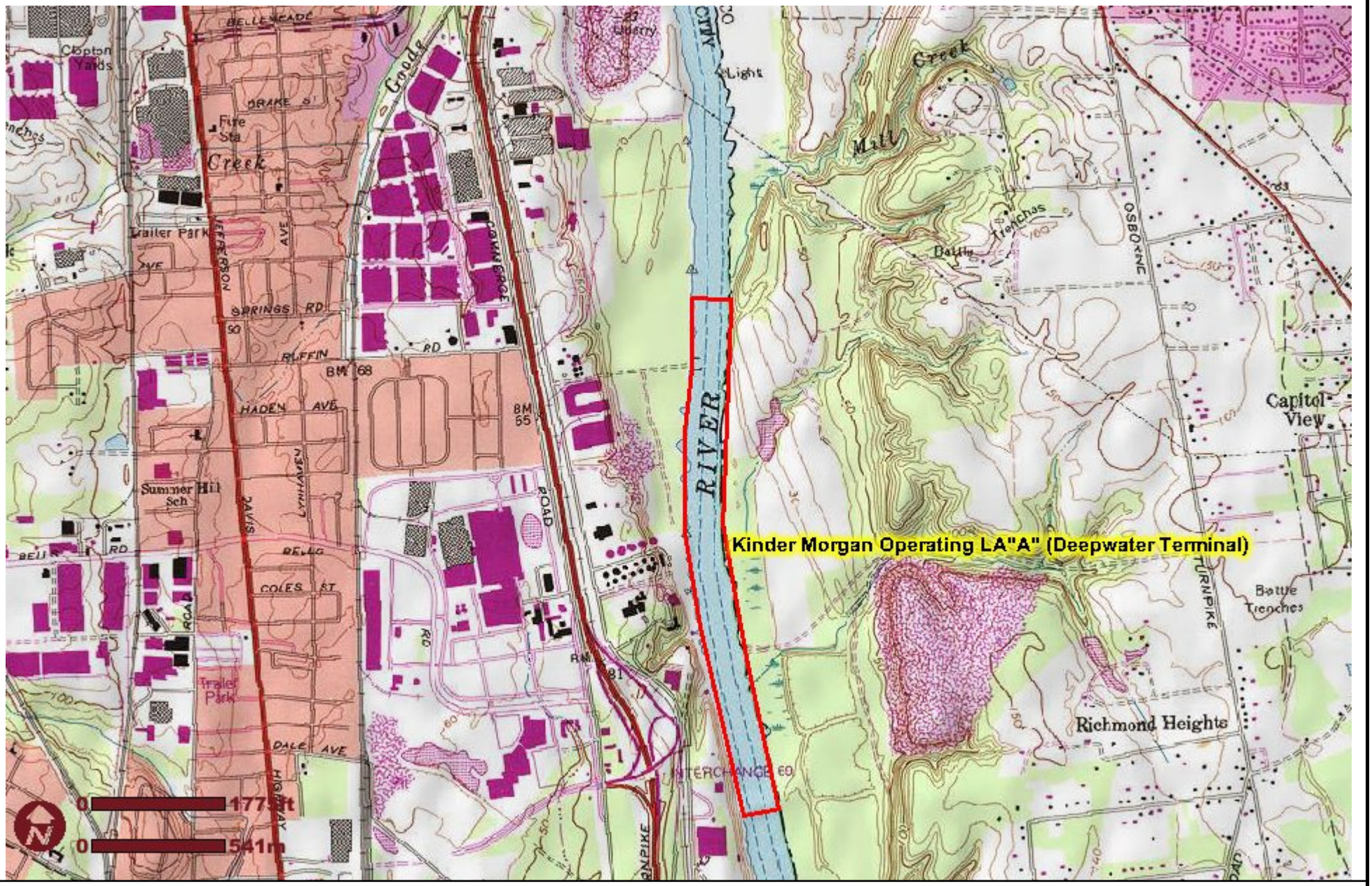
Phone: 804-527-5044 Fax: 804-527-5106 Email: Jeremy.Kazio@deq.virginia.gov

Conservation Site Name	Site Type	Brank	Acreage	Listed Species Presence
	GLNHR			NL
	GLNHR			NL
COLES RUN HABITAT ZONE	Conservation Site	B5	276	SL
CORNELIUS CREEK	Conservation Site	B5	109	FL

Natural Heritage Conservation Sites within Search Radius

Site-Name	Group-Name	common-name	scientific-name	GRANK	SRANK	Fed Status	st status	EO Rank	last obs date	precision
	Invertebrate Animal	Laura's Clubtail	Stylurus laurae	G4	S2			H	1931-08-02	G
	Vascular Plant	Viperina	Zornia bracteata	G5?	S1			H	1940-07-13	M
CORNELIUS CREEK	Vascular Plant	Swamp-pink	Helonias bullata	G3	S2S3	LT	LE	D	2006-05-09	

Natural Heritage Resources within Search Radius



Quads: DREWRYS BLUFF

Counties: Henrico,City of Richmond

Kinder Morgan Operating LA"A" (Deepwater Terminal)

Company: DEQ-Piedmont Regional Office

Lat/Long: 372853/772522

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources from the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics files, NATURAL HERITAGE RESOURCES HAVE BEEN DOCUMENTED within two miles of the indicated project boundaries.

You have submitted this project to DCR for a more detailed review for potential impacts to natural heritage resources. DCR will review the submitted project to identify the specific natural heritage resources in the vicinity of the proposed project. Using the expertise of our biologists, DCR will evaluate whether your specific project is likely to impact these resources, and if so how. DCR's response will indicate whether any negative impacts are likely and, if so, make recommendations to avoid, minimize and/or mitigate these impacts. If the potential negative impacts are to species that are state- or federally-listed as threatened or endangered, DCR will also recommend coordination with the appropriate regulatory agencies: the Virginia Department of Game and Inland Fisheries for state-listed animals, the Virginia Department of Agriculture and Consumer Services for state-listed plants and insects, and the United States Fish and Wildlife Service for federally listed plants and animals. If your project is expected to have positive impacts we will report those to you with recommendations for enhancing these benefits.

Please allow up to 30 days for a response.

We will review the project based on the information you included in the Project Info submittal form, which is included in the report that follows. Often additional information can help us make a more accurate and detailed assessment of a project's potential impacts to natural heritage resources. If you have additional information that you believe will help us better assess your project's potential impacts, you may send that information to us. Please refer to the project Title (from the first page of this report) and include this pdf file with any additional information you send us.

Thank you for submitting your project for review to the Virginia Natural Heritage Program through the NH Data Explorer. Should you have any questions or concerns about DCR, the Data Explorer, or this report, please contact the Natural Heritage Project Review Unit at 804-371-2708.
its.